

AFAPL-TR-79-2040



PHYSICAL AND CHEMICAL PROPERTIES OF JP-4 FUEL FOR 1978

Fuels and Lubrication Division Fuels Branch



April 1979
TECHNICAL REPORT AFAPL-TR-79-2040
Final Report for Period January - December 1978

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This technical report has been reviewed and is approved for publication.

Blaine A. Heitkamp

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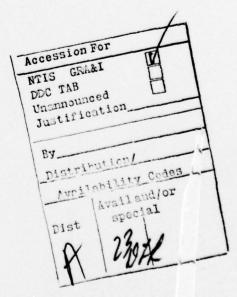
#### FOREWORD

This JP-4 fuels report was prepared by the Fuels Branch of the Air Force Aero Propulsion Laboratory, Air Force Systems Command, Wright-Patterson AFB, OH. The work was performed under work unit 304805FL.

Mr. B. A. Heitkamp was project engineer.

This report presents a computer generated and assembled statistical summary of the chemical and physical properties of JP-4 Jet Fuel. These fuels were procured by the Defense Fuel Supply Center during the calendar year 1978.

The author wishes to extend his gratitude to Miss Cheryl Florence and Mr. Kermit Redmon for their assistance in assembling the data. Appreciation is also extended to Miss Elaine Baldwin. Miss Charlene Diamond, and Mrs. Linda Phillips for their support in assembling this report.



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#### SECTION I

### INTRODUCTION

This report is a statistical summary of assorted properties of JP-4 Aviation fuel delivered to the Department of Defense during the calender year 1978. These various properties are recorded on a fuel batch inspection report, a copy of which is submitted to the Air Force Aero Propulsion Laboratory. Approximately twenty percent of these inspection reports are the basis for this report. Similar fuel reports were presented in the years 1963 through 1967, 1970, 1972, & 1975.

This report will provide a quick reference on JP-4 fuel quality.

One will be able to identify numerous ranges of properties along with their incidence, and also identify differences between geographical districts.

# SECTION II ORGANIZATION OF DATA

### GEOGRAPHICAL DISTRICTS

Fuel inspection reports have been separated into eight geographical districts according to point of origin. These districts are listed in Table I and are essentially the same as those designated by the Petroleum Administration for Defense. These districts may be summarized as follows:

- 1. East Coast
- 5. Pacific
- 2. Midwest
- 6. Far East
- 3. South
- 7. Europe and Near East
- 4. Rocky Mountain
- 8. South America, West Indies, and Canada

It should be emphasized that this classification is based on point of origin (refinery location) and not destination or point of use.

### TESTS SELECTED

Twenty-three of the inspection tests required by the JP-4 specification, MIL-T-5624K, were selected for analysis of results. These tests differ slightly from the tests analyzed in the previous report. In this year's report, the fuel thermal stability is measured by the JFTOT Fuel Coker (ASTM Method D 3241) only. A new parameter has been added as well. The percentage of Hydrogen is calculated from submitted properties. The calculation for this is found in the 1976 Annual Book of ASTM Standards, Volume 25<sup>1</sup>. Also, smoke volatility index has been eliminated as a parameter. Finally, the units for net heat of combustion have been changed from BTU's/1b to mega joules/kilogram (MJ/kg).

<sup>1</sup> ASTM D3343, Standard Method for Estimation of Hydrogen Content of Aviation Fuels.

TABLE I
GEOGRAPHICAL DISTRICTS

DISTRICT 1	DISTRICT 2	DISTRICT 3	DISTRICT 5
Connecticut	Illinois	Alabama	Arizona
Delaware	Indiana	Arkansas	California
District of Columbia	Iowa	Louisiana	Nevada
Florida	Kansas	Mississippi	Oregon
Georgia	Kentucky	New Mexico	Washington
Maine	Michigan	Texas	Alaska
Maryland	Minnesota		Hawaii
Massachusetts	Missouri	DISTRICT 4	
New Hampshire	Nebraska	Colorado	DISTRICT 6
New Jersey	North Dakota	Idaho	Far East
New York	Ohio	Montana	
North Carolina	Oklahoma	Utah	DISTRICT 7
Pennsylvania	South Dakota	Wyoming	Europe
Rhode Island	Tennessee		Near East
South Carolina	Wisconsin		
Vermont			DISTRICT 8
West Virginia			South America
Virginia			West Indies
			Canada

The ASTM method number and the ASTM precision statements refer to those found in the previously mentioned book of standards, including Volumes 23 and 24. The specification test limits refer to publication MIL-T-5624K dated 1 April 1976 and are much the same as the previous edition of MIL-T-5624J of 30 October 1973.

### TABULATED DATA

Many reports submitted contained values which were invalid or ambiguous, and therefore the value was waived. Mercaptan Sulfur was excluded in about 50% of the reports. This is due to the fact that there is an alternate test, called the Doctor Test, which is also acceptable under MIL-T-5624K. Recovery at 400°F, though still reported by many fuel suppliers and included in Table XXV, is no longer a required parameter and is therefore eliminated from the District Report.

Tables III through XXIV of Appendix A are computer printouts of the distribution, mean, and standard deviation for each fuel property. These tables are each arranged by geographical district while Table XXV gives the 1978 overall population totals for each fuel property. Nomenclature for these tables is as follows:

SIGMA	Standard	deviation

REPORTS Total number of fuel reports represented.

SAMPLES Number of reports with valid value.

MISSING VALUES Number of reports with missing or invalid values.

GTR Greater than.

LEQ Less than or equal to.

FREQ Number of values within limits shown.

PCNT Percent of values within limits shown.

ACUM Cumulative percent to upper limit.

### HISTOGRAMS

Figures 1 through 24 of Appendix B are computer-generated plots of the distribution data given in Tables III through XXV of Appendix A. These histograms represent a convenient visualization of the property frequency distributions.

# SECTION III METHOD OF DATA REDUCTION AND ANALYSIS

The method of data reduction and analysis used in this year's report is basically the same as used in the previous report by Mr. L. C. Angello<sup>2</sup>.

Fuel reports from one complete week were separated from the monthly total and used for this report. This procedure was followed for each month in 1978. In this way manpower output is reduced without significantly affecting the accuracy of the results.

<sup>2</sup> Angello, L. C., Physical and Chemical Properties of JP-4 Fuel for 1975, Wright-Patterson AFB, OH 1976.

# SECTION IV

As previously stated, the data presented in this report are based on a random sampling of monthly reports. Since these reports are provided without a specification of fuel quantity represented, equal weight is carried by each sample.

As could be expected, some of the reported values will be beyond specification limits. When this occurs, the value is waived.

As in the previous report (1975), no systematic effort was made to identify chronological trends. However, Table II will identify the differences in mean values between the previous report and this year's report, along with identifying the testing method and the units reported.

TABLE 11

MIL-T-5624K SPECIFICATION LIMITS FOR JP-4

METHOD	TEST	UNITS REPORTED	SPEC 1	SPEC LIMITS IIN. MAX.	1978 MEAN	1975 MEAN
D 86 D 1298 D 381 D 1552 D 1323 D 1323 D 1319	Distillation, IBP  10% Recovered 20% Recovered 50% Recovered 90% Recovered End Point % Recovered, 400°F API Gravity Existent Gum Total Sulfur Mercaptan Sulfur Reid Vapor Pressure Net Heat of Combustion Aromatics 01efins Smoke Point % Hydrogen WISM Particulate Contaminant Total Acid Number Filtration Time, 1 gallon Thermal Stability Ap	OF OF OF OF OF OF OF OF OF OF OF OF OF O	45.0 42.8 13.6 70.0	293 274 473 518 518 7.0 7.0 7.0 3.0 5.0 5.0 1.0 1.0	138 201 228 228 295 401 459 90.1 53.9 .8 .042 .0005 2.6 43.5 11.4 .8 27.6 14.36 90.0 .37	141 233 295 403 465 86.8 53.9 .6 .05 .006 43.5 10.9 .8 28.1  90.0
1	Tube Color Code	ASTM Color Code	1	33.5	1.0	. 84

(c) calculated from equation in 1976 Annual Book of ASTM Standards, Volume 25.

# SECTION V

APPENDIX A - Mean Values and Frequency
Distribution for 1978 Data

SAMPLES 66	HISSING	0.00 PRCNT OF REPORTS	SAMPLES 168	MISSING	1 .59 PKCNT OF REPORTS	SAMPLES 213	HISSING	36 15.14 PRCNT OF REPORTS	SAMPLES 59	MISSING	1.67 PACNT OF REPORTS
REPORT 66.	67R 165.	100.00	REFORT 169.	61R 165.	103.00	REFORT 251.	6TR 165.	100.00	REFORT 60.	61K 165.	100.00
14.5	61R 160. LEO 165.	18.18 95.45	13.8	6TR 160. LEO 165.	4.17	12.0	6TR 160. LEO 165.	.94	11.6	6TR 160. LEQ 165.	100.00
SIGMA	618 155. LEO	12.12	SIGHA	618 155. LEG 169.	7.14	SIGHA	6TR 155. LEG 160.	2.82 99.16	SIGHA	618 155. LEG 160.	100.00
147. SI	678 150. LEO 155.	7.53	140. SI	578 150. LEO 155.	6.55 84.52	135. SI	678 150. LEG 155.	7.93	133 <b>.</b> SI	618 150 Leo 155	6.78 130.00
1EAN	145. 145. 150.	13. ó4 57. 58	46 AN	67.8 145. LEQ 150.	8.33 77.98	4E AN	678 145	7.94	HEAN	145. LEG 150.	6.78
+	67R 140. LEQ 145.	10.61	ř	678 140. LEQ 145.	8.93 69.64	Ť	61R 140. LEG 145.	13.62	Ī	678 140	15.25
J 950	135 125 146	13.64	J 939	135. LEO 140.	16.67 60.71	u 970	135. 135. 146.	30 14.06 66.67	016 F	67 H 135. 140.	13.56
BULLING PI.	618 130. LF1 135.	9.09	BUILING PT.	678 139. LEQ 135.	17.26	<u>;</u>	678 133. Ltu	12.68 52.58	BOILING PT.	618 130. Leo 135.	15.25 57.63
	125. 170. 130.	10.61	THE - TENT	125. 125. LEG 131.	24 26.79	T. SCILING	671 125. 130.	39.51	INIT. BOILD	125. 125. 130.	11, 14, 64, 42, 37
LATH INTI	675 120. 173	. 50.		12.00 1.25.0 1.25.0	5,95	LATN INIT	670 129. LF0 125.	11 5.16 17.37		678 123. 125.	6.78 23.73
0787711474	115.	1.52	ווצנוררעניי	115. 115. 120.	6.98	DISTILLATN	67F 115. 150	6.10 12.21	CISTILLATY	115. 115. 120.	10.17 16.95
LISTALCT 1	115.	3.03	DISTRICT 2	115.	3.57	DISTRIC" 3	115.	6.10 6.10	4 TOLOTEIG	115.	6.79
17		FE ENT ALUM	Id		FE BO	10		FOR BOUNT	10		PENT PUTA

Table III. Distillation, Initial BP

SAMPLES 76	HISSING	1 1.30 PHONT OF REPORTS	SAMPLES 2	MISSING	0.00 0.00 PRCNT OF REPORTS	SAMPLES 9	MISSING	0.00 0.00 PECNT OF KEPORTS	SAMPLES 17	MISSING	PRCNT OF KEPORTS
7.			5.			6			17.		
REPORT	GTR 165.	1.32	REPORT	165.	100.00	REPURT	61k 165.	100.00	REFORT	61k 165.	100.00
11.3 R	618 161. LEG 165.	5.26 98.66	4.9	6TR 160. LEQ 165.	100.00	11.2 R	67P 160. LEG 165.	100.00	9.9	618 160. LE0 165.	100.00
SIGHA	6TR 155. LEG 160.	3.95	SIGHA	618 155. LEQ 160.	100.00	SIGHA	61R 155. LEG 160.	11.11	SÍGHA	61R 155. LEG 160.	5.86
139. \$1	6TR 150. LEG 155.	6.58	125. SJ	678 150. LEG 155.	100.00	137. SI	GTR 150. LEG 155.	36.83	142. SI	678 150. 1.50	5.88
4EAN 1	6TR 145. LEQ 150.	3.95	HEAN	677 145. LEG 150.	100.00	1E AN 1	678 145. LEQ 150.	11.11	1EAN 1	145.	5.38
¥	6TR 140. LE0 145.	14.47	7	678 140. LEQ 145.	10.00	¥	61R 140. LEQ 145.	11.11	¥	67R 140	35.25 35.25
DEG F	135. 140.	21.05	7 930	135	106.00	3EG F	135. 135. 149.	22. 22	9FG F	135. 140.	2c.41
SCILING PT. C	678 130. LF0 135.	25.00	BUTLING PT.	675 130. LEQ 135.	100.00	<u>.</u>	618 130. 150	***	POILING FT. D	130. 1130.	17.65
	67F 125. LEO 130.	9.21		678 1256 150	50.00	. BOILING	67r 125. LEO 136.	6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		125. 130.	
DISTILLATH THIT	120. 120. 125.	5.26 9.21	DISTILLATA INIT	67K 120. LED 125.	00.00	DISTILLATH INIT	67F 120. Lcg 125.	0.00	LISTILLATH INT.	125. 125.	0.03
DISTIL	6TR 115. LEQ 120.	2.63	DISTIL	67R 115. LEQ 120.	50.00	DISTIL	618 115. LEQ 120.	11.11	יואנוי	618 115; 129.	0000
DISTRICT 5	115.	1.32	DISTRICT 6	115.	00000	DISTRICT 7	LE0 115.		DISTRICT 8	115.	0.00
SIO		FR FO FC NT	018		FI FO PCNT ACUM	210		FF ED FC UP	018		FFENT

Table IV. Distillation, 10% Recovered

SAMPLES 76	HISSING	1.30 1.30	SAMFLES 2	MISSING	0.00 0.00 0F REPORTS	SAMPLES 9	HISSING	0.00 0F KEPORTS	SAMPLES 16	MISSING	5.88
.77.		PHCNT OF	2.		PKCNT OF	٠, د		PRCNT OF	17. S		
REFORT	61A 235.	100.00	REPORT	6TR 235.	100.00	KEPORI	61A 235.	100.00	FEPORT	67R 235.	99.0
12.2 R	67R 230. LEQ 235.	2.63	14.1 8	678 230. LEQ 235.	100.00	12.3	61R 230. LEQ 235.	106.00	14.5	67R 23J. LEO 235.	0.00
SIGHA	6TR 225. LF0 230.	6.58	SIGMA	613 225. LEG 233.	50.00 100.00	SIGHA	618 225. LEU 230.	1,0,00	SIGMA	618 225. LEO 230.	12.50
206. S	678 220. LEO 225.	7.89 50.73	218. S.	67R 220. LEO 225.	0.00	206. SI	220. LEG 225.	11.11	201. SI	618 220. LEG 225.	0.00
4E AN	678 215. LEO 220.	5.26	4E An	6TR 215. LEO 220.	0.00	HEAN	67 R 215. LEG 220.	11.11 8 8 8 8 9	AC AN	618 215. LEG 220.	0.00
Ŧ	61R 210. LLQ 215.	6.58	Ŧ	6TR 210. LEQ 215.	90.06	¥	61R 210. LEQ 215.	22.22 77.7c	£	61P 210. LEO 215.	6.25
Ŀ	205.	21.15	u	615 205. LEQ 210.	50.00		61F 205. LEG 210.	11.11	u.	676 205. 160 210.	18.75
ED, NEG	618 200. LEQ 205.	15.79	PECOVETER, DEG	618 209. LEO 205.	9.90	FU, 9EG	61R 200. LLO 205.	11.11	REFOVEREU, DEG	676 200. 160 265.	6.25
C FEFOVERED.	617 195. LEO	34. 21		67F 195. LF0 206.	300	. RECOVEREU.	195. 195. 230.	35.33	RFFOVER	676 195. 186 200.	6.25
TETH 10%	193. 195.	9.21	1 ATM 192	676 120. 125.	0.00 0.00 0.00	LATN 192	675 130. 145	11.11	LATH 19%	678 190. 190.	18.75
CISTILLTI	613 1150	7.64	ונצוורענא	135. 135. 190.	9600	DISTILLATIN	185. LEO 196.	22.22	LISTILLATY	676 185. 190.	31.25
OTSTOICT 5	160	3.00.00	01570167 6	135.	0.00	DISTRICT 7	LEG 185.	0.00	DISTRICT &	100	12.50
10		ACUT.	16		75.50 75.50 75.50	10		FF FONT	10		FORT FORT

SAMPLES 65	HISSING	1.52 PRCNI OF REPORTS	SAMPLES 159	MISSING	5.92 PKCNT OF KEPORTS	SAMPLES 250	MISSING	PRCNT OF REPORTS	SAMPLES 60	MISSING	0.00 PACNT OF REPORTS
PEPONT 66.	6114 275.	0 0.00 100.00	KEPORT 169.	678 275.	100.001	REFORT 251.	6TK 275.	1.00	REPORT 60.	GTR 275.	100.00
17.1 6	678 265. LEQ 275.	1.54	20.7	6TR 265. LEO 275.	5.66 95.60	22.5	6TR 265. LEO 275.	11 4.40 98.40	23.3 6	6TR 265. LEQ 275.	1.67
SIGHA	255. 255. 265.	93.66	SIGHA	618 255. LEG 265.	3.14	SIGHA	618 255. 160 265.	4.40 94.00	SIGHA	618 255. LEO 265.	6.67
510. SI	245. LED 255.	4.62	232. SI	245. 245. 255.	6.92	226• SI	245. LEG 255.	8.40 89.60	229. SI	618 245. LEG 255.	11.67
4EAN	618 235. LEQ 245.	1.54	FAN	618 235. LEO 245.	15.09 79.47	1EAN	618 235. Le 0 245.	48 19.20 81.20	HEAN	6TR 235. LEQ 245.	6.67
Ť	61R 225. LEQ 235.	27.69	Ŧ	678 225. LEG 235.	27.67	Ť	61R 225. LEO 235.	26 10.40 52.00	Ŧ	67R 225. LFQ 235.	11.67
L	215. LEO 225.	72.31 64.62	<b>L</b> .	618 215. LE 0 225.	13.84	L.	215. LEO 225.	35 14.60 51.60	u	515. 110 225.	21.67 55.00
10, Jes	67K 265. LEG 215.	7.69 32.31	PECOVERED, DFG	678 235. Lt Q 215.	19.50	FECOVEFES, OFG	678 205. LFU 215.	17.63	°0, 016	67 K 205. LEU 215.	11, 11, 11, 13, 33
RECUVER	61. 195. 235.	16.77		195. LF3. 205.	3.77	15/00/56	615 195. LEO 205.	20.00 20.00	, PF00VEF09	575 195. 160 205.	15.00
202 1-01	678 175. 175.	12.31	LAT" 29%	67.8 13.5 17.4 175	1.26	LAT : 29%	67 K 145. 195.	22, 46	LATH 20%	67 R 165. 195.	00.00
DISTILL 4	678 175	1.54	UISTILLATM	678 175. LFO 185.	6.00	LISTILLATE	175. 175. 150		DISTILLATM	67F 175. 150 185.	0.00
DISTRICT 1	175.	.00	DISTRICT 2	175.	0000	PISTRICT 3	LEG 175.	0000	DISTRICT 4	175.	00.00
OIG		FC NT P	0.0		PE ENT	217		PC MT	01.0		FE EO FC W

Table V. Distillation, 20% Recovered

DISTRICT S	DISTIL	LATH 20%	E.	EC, DEG	u.	<b>₩</b>	AN	231. S	IGHA	15.6 R	EPORT	.77	SAMPLES	"
175.	678 175. 150 135.	57k 1°5. L'0 195.	67.1 195. LEG 205.	678 205. LCQ 215.	215. 215. 225.	67h 225. LEQ 235.	6TR 235. LEU 245.	6TR 245. LEG 255.	618 255. LEG 265.	67F 265. LEG 275.	6Th 275.		MIS	MISSING VALUES
000	0.00.0	0.3.0	2.60	6. 9.00 9.00	25. 52	76.36 74.03	6.49	7.79 88.31	9.05	2.60	100.00	9	P	0.00 REPORTS
DISTRICT 6	DISTIL	LATH 20%	RECCVER	El, Des	L	¥	AN	244. \$	IGHA	38.2 RE	EPORT	.5	SAMPLES	~
LEG 175.	61k 175. 150 185.	61h 135. LEQ 145.	678 195. 180 205.	678 205. LEQ 215.	615 215. 225.	618 225. LEG 235.	614 235. LLQ 245.	67 R 245, LEG 255,	6TR 255. LEG 265.	678 265. LEO 275.	67E 275.		MIS	MISSING VALUES
0.00	0.00	900.0	300	0.00	50.01 50.00	00.05	0.00	0.00	)n • 0 6	50.00	104.00	28.		0.00 REPORTS
DISTRICT 7	DISTIL	LATA 29%	FECOVER		u.	¥	A	230. S	EGMA	12.0 RE	EFORT	÷	SAMFLES	σ
175.	175. 175. L±0 155.	613 1150 125	676 195. LFO 265.	205. 110 215.	616 215. 110 225.	618 225. LEO 235.	612 235. LEG 245.	678 245 Lic 255	618 255. LEG 265.	618 265. LEQ 275.	6Th 275.		MIS	MISSING VAL DES
0.00	00000	00°0°	30.0 30.0	900	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22.22	22.22	11.11 100.00	100.00	0.00 100.00	100.00	PKC	OF REP	0.00 REPORTS
DISTRICT :	וצוויי	26%	12		L	#		.825	LGHA	12.3 46	EPCRI	17.	SAMFLES	16
LE0 175.	678 175. 160 135.	678 105. 195.	617 195. LEO 205.	67.8 205. LEO 215.	215. 150 225.	618 225. LEQ 235.	618 235. LEG 245.	67 R 245. LEG 255.	618 255. LEG 265.	618 265. LEQ 275.	6Tk 275.		MISSING	SING
0.00	390	0.00	35	12.50	31.25	71.25 75.00	12.53 87.50	12.50	0.00	0.00	104.00	PRC	8	5.88 REPORTS
		ω	5 DISTILLATM 20%  6 TK  6 TK  6 CLSTILLATM 20%  6 CLSTILLATM 20%	678 678 195. 156. 157. 195. 157. 157. 195. 157. 195. 195. 157. 195. 195. 175. 157. 157. 175. 157. 157. 175. 157. 157. 175. 157. 157. 175. 157. 157. 175. 157. 157. 175. 157.	6 DISTILLATW 20% RECOVEREC, DLG 678 175. 195. 195. 205. 180. 195. 195. 205. 180. 195. 205. 215. 195. 195. 205. 215. 196. 196. 196. 215. 197. 197. 180. 180. 180. 180. 180. 180. 180. 180	6 DISTILLATW 2012 RECCVFFEC, DLG F  175. 135. 135. 205. 205.  175. 175. 135. 205. 215.  175. 135. 135. 205. 215.  175. 135. 135. 205. 215.  175. 135. 135. 135. 205.  175. 145. 135. 205.  175. 145. 145. 205.  175. 145. 145. 205.  175. 145. 145. 205.  175. 145. 145. 205.  175. 145. 205.  1	5 DISTILLATM 20% RECCVEFED, DLG F  175. 1°5. 195. 205. 215. 225.  1150. 1°5. 195. 205. 215. 225.  1150. 1°5. 195. 205. 215. 225.  1250. 1°5. 195. 205. 215. 225.  1250. 0°0 0°0 0°0 0°0 0°0 0°0 0°0 0°0 0°0 0	CINTILLATIVE 20% SECCYFEE, DLG F   HEAN	STRILLLTH 20% RECCVEFEC, DLG F	STILLATH 2012 RECOVERER, DLG   F	Color   Colo	STILLATY 20% GECKFEE, DLG F	Column   C	Color

SAMPLES 66	*ISSING VALUES	PRONT OF REPORTS	SAMPLES 157	MISSING VALUES	7.10 PRCNT OF REPORTS	SAMPLES 244	MISSING	2,79 PACNT OF REFORTS	SAMPLES 60	MISSING	D.00 PACNI OF REPORTS
FFPORT 56.	6TK 373.	100.00	KE FUR] 169.	671€ 370•	100.00	PEFORT 251.	67Ř 376.	100.00	REFURT 60.	57.5 370.	0.00
21.7	67K 355. LFQ 370.	1.52	22.0	6TR 355. LEQ 370.	1027	1 1.15	618 355. LEG 370.	2.05	26.6	6TR 355. LEQ 370.	100.00
SIGFA	61 2 340. LEQ 355.	9.39.39	SIGHA	67R 340. LEG 355.	98.73	SIGHA	340. 160 355.	3.69	SIGMA	618 340	100.001
305. SI	325.	7.58 49.39	285. SI	325. 125. 340.	5.10 96.73	302. SI	325. LEQ 340.	25. 4.26. 54.26	283. SI	GTR 325. LEG 340.	5.00
45.AN	678 310. LEU 325.	12.12 81.62	1EAN	618 310. LEG 325.	7.01 93.63	4E AN	310. 160 325.	25.41 84.43	AF AN	315. 315. 150	13.33
÷	678 295. LEQ 310.	36.30	Ŧ	61K 295. Leg 310.	10.83 86.62	¥	67R 295. LEO 310.	23.77 59.02	¥	295. LEQ 310.	11 67 67 67
( <u>a.</u>	7.1 25.0 1.10 295.	31.62 39.39	i.	25.0 29.0 29.5	36 22.93 75.80	u	29 8. 29 8. 29 5.	14.75 36.25	u.	295.	13,33
eft, 016	673 265. LED 289.	7.58	.F0, 0re	6. k 265. LEG 288.	35.67 52.47	KECOVEKED, DES	678 265. LEQ 280.	9.02	£0, 086	67P 265. LFQ 280.	13.33
SECUNTREC.	677 256. LEG 265.	0.00	HECOVERED.	250. LFG 265.	26 16.56 17.20	KECOVER	676 250. LEO 255.	6.15	PECOVEREU.	678 250. LFG 265.	26. 67 35. 67
LATN 50%	67 H 235. LEO 250.	390 •• ••	LATN 59%	6. P 235. LEQ 250.	60.0	LATN 50%	678 255. 259.	3.65	LAT 4 50%	235. 250.	9.33
PISTILLATW	67 0 22 0 1 c 0 23 5	0.00	DISTILLATA	678 220. 160 235.	1999	OTSTILLATM	675 220. LEQ 235.	1.64	DISTILLATA	67.8 220. LED 235.	1.67
PISTRICT 1	220.	0.00	DISTRICT 2	220.	0.00	DISTRICT 3	220.	0.00	DISTRICT 4	220.	00.0
lu.		75.00 70.00	10		PCNT	916		FOED PCNT ACUM	0.75		PO P

Table VI. Distillation, 50% Recovered

77. SAMPLES 76	MISSING	1.30 PACNT OF REPORTS	2. SAMFLES 2	MISSING	U. 0 U. OC PECNT OF REPORTS	9. SAMFLES 9	HISSING VALUES	PHONT OF REPORTS	17. SAMPLES 17	MISSING	D. 0 PHUNT OF KEFORTS
REPORT 7	5Th 370.	0.00	FEFORT	57.k 370.	106.00	FEPURT	51x 37u.	100.00	PEFORT 1	6Th 370.	3000
28.9 RF	355. LEG 370.	160.001	24.7 FE	355. 160 370.	100.00	21.2 FE	678 355. LEG 370.	100.00	21.6 FE	618 355. LEG 370.	5.88
SIGHA	34J.	6.56 100.00	ытень	340. 150 355.	50.00	SIGHA	355.	0.00	SIGHA	340. 1.E3	5.88
.685	325. 125. 346.	53.42	328. 53	325. 125. 340.	9.00	332. S.	325. 34.05.	64.13	320. SI	325. 325. 340.	29.41
HEAN	316. 325.	9.21	NA 31	310. 120. 325.	0.00	JE AN	310. 125.	0.000	4E AN	313. 1253	58.53
Ť	255. LEG 310.	11.64	Ť	61k 295. LEG 310.	50.03	ř	616. 295. 160	3000	Ŧ	618 295	29.41
i.	253.	63.21	L	2.50 2.50 2.50	9.00		295.	N N N	u.	295.	.00.00
ED. 086	265. LFD 26.0.	53.95	50, 06 G	67.c 265. LFQ 289.	0.00	PECTVERED, DEG	265.	00.00	10, 006	265. LFO	5.32
3 HELLENE	671. 255. LEG 265.	15.79	. HECOVERED,	256. 256. 265.	00.00		67. 256. 1.F.G. 265.	56	PECCNERE	25%. 1.50 265.	.00
TEETH 50%	6.8 235. 150 250.	2.63	LATE 50%	275. LEO 2550.	0.00	203 114	235. 250. 250.	0.00	LATA 50%	235. Leo 251.	
LISTIC	677 220. 160 235.	060	LISTILL	67.8 220. LEG 235.		(15776-474	220. 150	00.00	רואוור	678 220. LTD 235.	3.000
DISTRICT 5	220.	00000	DISTRICT 6	220.	0.00	DISTRICT 7	220.	300	DISTRICT &	220.	
10		A P P P P P P P P P P P P P P P P P P P	10		FFED FC NT AC UM	010		F 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	013		FRED

SAMPLES 66	PISSING	PR.NT OF REPORTS	SAMPLES 159	MISSING	5.92 PRCNI OF REPORTS	SAMPLES 250	NISSING	PHONT OF REPORTS	SAMPLES 60	MISSING	0.00 PKCNT OF REPORTS
FFP 0R1 66.	470.	100.00	REPURT 169.	GTR 470.	100.00	REFORT 251.	67K 470.	100.00	REPORT 60.	470.	100.00
12.4 F	678 455. LEO	100.00	37.5 R	618 455. LEQ 470.	1.26	28.2 F	6TR 455. LEG	100.00	31.3 8	6TR 455. LEG 470.	100.00
SIGHA	618 440.	12.12	SIGHA	6TR 440. LEG 455.	1.89	SIGHA	678 440.	7.66	SIGHA	67R 4460.	100.00
428. SI	4.55 6.55 6.55	34.52 d7.98	388. 51	618 425.	14.47	. 80,	678 425.	23.00	364.	67R 425. 440.	11.67
1FAN .	410. LEQ 425.	30.30	4E AN	678 410. LEG	15.72	1EAN	410. LEQ	28.40	1EAN	6TR 410. LEQ 425.	13.33
4.	395. LL0	1.52	Ŧ	410.	13.94	Ť	365. 160	18.46	¥	51K 395. LF0 410.	13.33
i.	340.	£.553	L	395.	12.56	u	757 750 750 750	31 12.40 25.60		3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	13.33
FO, 086	365.	9000	Fr. 986	67.k 365.	16.97	FEGOVERED, DEG	518 162 363.	13.20	FD, 066	678 365. 150 360.	15.00
DECOVERFO.	355.	996	FECTVE	616 356. 166	3.27		357. LFG 355.	3.20	CECCVEFFD.	356. 160 365.	13.73 33.33
200 1121	3350.	.00	LATA 962	335. 150 350.	7,55	LATN 982	335. LEG 350.	5.23.	LATH 902	335. LEQ 350.	14.33
CISTILL STU	720. 120. 335.	00.00	SISTILLATA	323. 153 335.	5.03 16.36	UTSTILLATM	67 P 720. LEG 335.	1.6.	DISTILLATH	678 720. 160 335.	1.67
UTSTRICT 1	329.	0.000	DISTRICT 2	320.	50.63	DISTRICT 3	326.	1.20	DISTRICT 4	150 320.	0000
10		FC NT	10		PC NT	10		ACUM ACUM	10		FP FO FONT

Table VII. Distillation, 90% Recovered

77. SAMFLES 77	hISSING VALUES	9.00 PRCNT OF REPORTS	2. SAMPLES 2	HISSING	PRCNT OF NEPORTS	9. SAMPLES 9	MISSING VALUES	PACNT OF REPORTS	17. SAMPLES 17	MISSING	0.00 PRENT OF REPORTS
PEPORT	470.	100.00	REPORT	67k 470.	0.00	FEFORT	61x 47u	0.00	EEFORT 1	67k	00.001
46.7 8	67R 455. 120	1.30	2.6 RE	455. LEG 470.	100.00	7.3	6TK 455. LEO 470.	100.00	19.6	618 455. LE0	100.00
SIGHA	678 440. LEQ 455.	12.99 98.70	SIGHA	678 440. LEG 455.	100.00	SIGHA	6TP 441. LE3.	30.00	SIGHA	4 L L L L L L L L L L L L L L L L L L L	5.86 100.00
194.	425. 425.	19.48 85.71	413. 51	678 4.25 4.40	3.30	408. SI	6778 1255	100.00	413. SI	678 4225.	41.18
4E.AN	618 410. LEQ	11.69	4F AN	678 410. LEO 425.	100.00	JEAN	410. LEQ.	100.00	15 AN	678 410. 425.	23.53
Ť	678 395. LEG	10.39	¥	577 345. LED 410.	999	Ŧ	395. 195. 110.	55.56	+	61h 395. LEQ	5.86
14	4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1.30	u	7.5.5. 7.0.5.	0.00	L	1011	0.00	ia.	35.0 10.0 10.0 10.0	17.05
FD, Oc 6	365. 165.	5.49	AECOVERED, DEG	514 365. 160 380.	0.00	0.00	365. LFQ 289.	9.00	26. DEG	67 R 365. LEO	5.88
NECOVERED,	355. 355. 365.	14.2° 36.76		355.	0.00	PECO VE	350. Lro 365.	3.00	15/0073	355. 156 365.	300
ZOE NIG	33.5	16.00	Z05 F147	335.	9.93	706 817	518 335. 1.2	0.00	200 6177	576 535. 11.0	00000
LISTILLATA	528 LEQ 335.	36.00	LISTILLATA	618 610 335	3.30	רוצנורינויי	720. 720. 720.	0.00	OISTILLAT?	422. 335.	00.00
OISTRICT 5	320.	000	01STPICI 6	320.	0.00	DISTRICT 7	320.	3000	DISTRICT 0	320.	0.00
01.0		FC 41	210		FE ED ACUM	018		FCMT AC UM	210		ACUT ACUT ACUT

MISSING VALUES

9

MISSING VALUES

0.00

PC NT

300.

99

Table VIII. Distillation, End Point

1.67

PC NT

300.

DISTRICT

380.

1.20

FRED

3.57

PC 44

380.

. SAMPLES 76	MISSING	1.30 PACNT OF REPORTS	SAMPLES 2	MISSING	0.00 PECNT OF REPORTS	SAMPLES 8	MISSING	11.11 PRONT OF REPORTS	SAMPLES 17	MISSING VALUES	0.00 PACNT OF REPORTS
".	~ :	000	2.	· .	999	<i>;</i>	<b></b>	200	17.	× •	993
REPORT	530 530	100.00	REPORT	67x 530.	100.00	REPORT	515 515 515 515 515 515 515 515 515 515	100.001	REFORT	67K 533.	100.00
36.7	6TK 515. LEO 530.	100.00		515. 160 530.	100.00	9.	67R 515. LED 530.	100.00	16.1	618 515. LEG 530.	100.00
SIGHA	500. LEO	100.00	SIGHA	500. LEU 515.	100.00	SIGHA	500. LEG 515.	163.00	SLGHA	618 560. LEO 515.	100.00
\$ .654	618 485.	25.00	447. S	500 S	100.00	.69.	51 4 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	10.00	471. S	678 485 500	35.29
1E AN	6778 479 169	10.53	AEAN	678 470 185	100.001	7 7	478 470 1550 485	25.00	1EAN	678 479. LEO	0.00
	678 455.	11.84	•	618 455. LEG 470.	100001	i	67R 455. LEQ 479.	5 62.50		612 155 170	52.94
	6.00°	7.69		677 14.0 15.0 45.5	100.00		61. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	12.50 12.50		6 1 1 4 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	11.76
9 930	618 425. LEQ	34.21	f. 6 F	618 125 140		ردو و	67.5 425. LE 0	300.0	9 530	67.9 425. LEQ	0.00
PCIA.T.	671 CEO	10.53	POIN.	67.1 410. LEG	90.0	F016",	678 410. Lt. 6	0.00	POINT,	67F 41U- LEO 425-	0.0
LaTa STA	678 205. 100 410.	7.89	LATH CND	518 395. LEO	0.000	LATN END	345. 110	000	TATH END	395. 150 410	0.00
LISTILLATA	393.	2.63.2	GISTILLATA	545 145 345	0.00	DISTILLATA	360. 160 395.	0.00	DISTILLATA	33.0. 150 375.	9.00
DISTRICT 5	380.	1.32	DISTRICT 6	350.	0.00	DISTRICE 7	380.	0000	DISTRICT 8	300	0.00
013		PE 50 PC NT ACUM	010		FPEG FCNT FCNT	210		FONT	10		FERS

SAMPLES 62	MISSING	6.06 PRCNT OF REPORTS	SAMPLES 156	MISSING	13 7.69 PRCNT OF KEPORTS	SAMPLES 251	HISSING	0 0.00 PRCNT OF REPORTS	SAMPLES 59	HISSING	1.67 PRCNT OF REPORTS
. 66.	61k 57.0	100.00	DRT 169.	6Th 57.0	00000	ORT 251.	6TR 57.0	100.00	ORT 60.	6TR 57.0	100.00
1.53 HEPORT	56.0 1.60 57.0	11.29	1.74 REPORT	678 56.0 LEO 57.0	36 23.06 106.00 1	1.51 PEFCRT	56.0 LEO 57.0	3.96 100.00 1	1.56 REFORT	618 56.0 LEG 57.0	23.73
SIGHA	618 55.0 LE0 56.0	30 44.35 88.71	SIGHA	618 55.0 LEO 56.0	33 21.15 76.92	SIGMA	618 55.0 LEG 56.0	43 17.13 96.02	SIGMA	618 55.0 LEG 56.0	15.25
94.9 SIC	54.0 24.0 25.0	20.97 40.32	)IS 5.4?	54.0 1.0 55.0	30 19.23	3.5 SI	678 54.0 160 55.0	34 13.55 78.88	4.5	618 54.0 55.0	11 18.64 61.02
AN 54	61R 53.0 LEO 54.0	12.90 19.35		618 53.0 LEG 54.0	17.31 36.54	u	678 53.0 LE0 54.0	21.54 65.34	A E A N	67 8 93.0 LEG 54.0	22.03
MEA	678 52.0 Ltd 53.0	0.00	1E AN	518 52.0 LFQ 53.0	5.77	HEAN	6TR 52.0 1.60 53.0	75.88	£.	678 52.0 LEQ 53.0	16.95
	6.1F 51.0 1.0 52.0	9.00		678 51.0 150 52.0	6.33 13.46		6.R 51.0 LEO 52.0	27 10.76 13.94		51.0 Lt.0 52.0	3.39
	672 56.0 51.0	3.23		50.1 150.5 51.0	5.13		50.0 1.60 51.0	2.39 3.15		678 50.6 1.0 51.0	1.69
14	67. 40.1 1.EG 50.1	3.23	16	671 49.0 50.0	9000		671 49.0 150 50.0	00 3 2 5	Tea	67. 40.0 1.50 50.0	0000
TOR DEG .	6.5. 6.5. 6.5. 6.5. 6.5. 6.5.	000	9		00.00	, DEG 19T	7.64 7.64 9.66	0.00	1, DEG 4	7 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 . 0 .	9.00
GRAVITY	61 F 47.1 45.0	00000	G'AVITY, DE	67.7 1.77.0 49.0	00.0	GRAVITY, DEG	47.9 47.9 46.0	00000	GRAVITY	61.8 47.3 LEQ 40.0	0000
DISTRICT 1		0.00	STRICT 2		00.00	DISTRICT 3	LEG 47.0	000	ATSTRICT 4	47.0	000
015		PCNT	0.75		PP PP NT	015		P P P P P P P P P P P P P P P P P P P	5		A PER

10	DISTRICT 5	GRAVITY,	930	Ice			Ť	HEAN	52.4 51	SIGMA	2.49 F	REPORT	.77	SHAPLES	12
	LEQ 47.0	678 47.0 160 48.0	618 68.0 69.0	678 49.0 LEQ 50.0	67R 50.0 LEQ 51.0	67 F 51.6 160 52.0	6TR 52.0 LEQ 53.0	53.0 1.50 54.0	678 54.0 LEO 55.0	678 55.0 LEG 56.0	678 56.0 LEG 57.0	67k 57.0		HISSING	SING
FRED FCNT	2.78	5. 55 5. 35 3.33	15.28	2.75	6.94 25.00	36.11 36.11	6.94	20 27.78 79.83	16 22.22 93.05	4.17	2.78	100.00	P. C.	5.49 PRCNT OF REPORTS	6.49
10	DISTRICT 6	GRAVITY,	DEG	AP I			¥	HEAN	54.5 81	SIGHA	1.91 8	KEPURT	5.	SAMPLES	~
	47.0	678 47.0 48.0	443.0 6.00 6.00 6.00	677 49.0 1.E.G.	50.0 150 51.0	51.0 11.0 52.0	61k 52.0 LE4 53.0	67.8 53.0 LEG 54.0	51.0 54.0 1.E.0 55.0	618 55.6 LEG 56.0	6TR 56.0 LEG 57.0	61R 57.0		MISSING	SING
PC NT AC UM		000	00000	320	0.00	00000	0.00	5C.00 50.00	00.00	50.00 100.60	100.00	100.00	PRUNT	0 0.00 NT OF REPORTS	0.0 0RTS
10	DISTRICT 7	GRAVIT	GRAVITY, DEG A	10			Æ	HEAN	55.9 Si	SIGMA	38 86	REPORT	•	SAMPLES	ď
	LEG 47.0	678 47.0 180 48.0	6.5.5. 6.0.5.	67 F 49.0 1.7 G 50.0	676 50.0 LEG 51.0	6.8 51.0 1.0 52.0	678 52.0 110 53.0	67h 53.0 LFQ 54.0	50000 50000 50000	618 55.0 180 56.0	678 56.0 1.60 57.0	67k 57.0		MISSING	ESING
PE ED AC UH	0.00	00.0	000	300	200	900.0	00	11.11	0.00	11.11	86.89 100.00	0.000	Pro	0.0 PRINT OF REPORT	0.00 OKTS
10	DISTRICT 8	GRAVITY,	DEG	API			ž	FA	54.3	SIGMA	1.20 KE	KEPORT	17.	SAMPLES	17
	LEG 47.0	477 9 4 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	7 - 1 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6	64. 64. 50.0	618 50.0 51.0	67.8 51.0 15.0 52.8	61R 52.6 LEQ 53.0	67 8 53.0 LL0 54.0	54.0 LEG 55.0	618 55.0 LLG 56.0	6TR 56.3 LEG 57.0	67R 57.0		HISSING	SING
FRED FCNT	0000	00.00	000	000	00.0	5. 6. 6. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.	17.65	2 11.76 35.29	35.29	23.53	5.88	100.33	PECNT	0.00 NT OF REPORTS	. X

SAMPLES 66	HISSING	0.00 PACNT OF REPORTS	SAMPLES 165	MISSING	2.37 PRCNT OF REPORTS	SAMPLES 223	MISSING	28 11.16 PPCNT OF REPORTS	SAMPLES 54	MISSING	10.00 PRCNT OF REPORTS
PEFORT 66.	618 5.0	10000	REPORT 169.	618 5.0	100.00	REFORT 251.	616 5.0	100.00	REPORT 60.	5.0 5.0	10.00
.67 PE	618 4.5 LEG 5.0	100.00	.76 RE	618 LE0 5.0	100.00	.6u	5.5 5.0 5.0	100.001	69.	618 LEO 5.0	100.00
SIGHA	618 4.6 LEG	100.001	SIGMA	61 F F F F F F F F F F F F F F F F F F F	100.001	SIGHA	618 LEG 4.5	30.0	SIGHA	LEO.	100.00
., S.	61 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	100.00	6.	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1.82	. 81	3.00 t	99.55		678 1.50 4.0	100.00
4E AN	3.5 3.5	100.00	AEAN	8.5 8.5 8.5	. 61 96.18	1F AN	618 3.5 3.5	00.00	4 PA	3.5	100.00
4	614 2.5 LEQ 3.0	3.03	Ť	61.8 2.5 1.50 3.0	1.82	Ŧ	618 2.5 LEO 3.0	1.35	Ť	678 2.5 1.69 3.8	1.85
	67.6 2.6 1.60 2.5	0.00		2.5	2.45		5:5 2.5 2.5	1.35		8.037 8.037 8.037	7.41
	678 1.5 2.0	9.09		678 1.5 LEQ 2.0	110.30		618 11.5 2.6	4.34		618 2.0 2.0	5.56
6/1/02/	67: 1.0 1.5	4.55 87.86	16/10 CM	1.5 1.5 1.5	12.12	16/10 EM	1.5	7.17	46/10PL	£	3.76
EXISTENT GUL,	16.05. 1.00.1	36.36	41 6U1,	678 • 5 1.0	27.85	NT GUM,	6.8 150 1.1	65 29.15 85.65	NT 6UH,	61 x CEO	29.63
	67.8 9.0 15.0	31 45.97	Th aLSIX 3	6.69 0.91 0.83	37.58	EXISTENT 6	619 60.031 60.031	110 49.33 56.50	EXISTENT 6	5.031 5.031	23 42.59 51.85
DISTRICT 1	5.	0000	OISTPIC: 2	LEO C.	7. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2	DISTRICT 3	LEG	7.17	DISTRICT 4	0.0	9.26
018		PE BO	010		PC 410	0.13		PCNT ACUR	110		PC4T

77. SAMPLES 77	MISSING	0.00 FACNI OF REPORTS	2. SAMPLES 2	MISSING	0.00 FECNT OF REPORTS	SAMLES 9	MISSING	9.00 PACNT OF REPORTS	CAMPLES 13	HISSING	23.53 PACNT OF REPORTS
REPORT	5.0 5.0	103.00	REPORT	5. ů	9.00	KEPORT	6Tr. 5.0	6.00	情	67x 5.0	100.00
.34 85	678 4.5 1.60 5.0	1000	.14 RE	618 163 5.0	100.00	. 32 KE	616 4.5 LE3 5.0	100.000	· · · · · · · · · · · · · · · · · · ·	67k 4.5 LE3 5.3	100.00
SIGMA	614 6.50 4.50	000000000000000000000000000000000000000	SIGHA	15. 15. 15. 15. 15. 15.	30.001	SIGMA	61 to 62 to 63 to	100.00		618 LE0	100.001
18 2.	3.5	163.03	1.1	3 5 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	3.00	18	6.5 6.5 6.0 6.0	100.00	1.3	F. 50.3	103.03
45 AN	3.5 3.5 3.5	3.30	SEAN	8.5 0.53.0 2.5	100.00	4E AN	3.5 3.5	100.00	A E B N	G 3.5	100.00
*	67F 2.5 160 3.0	100.00	¥	677 2.5 3.6	100.001	Ŧ	618 2.5 1.50 3.5	100.00	ř	618 8.5 3.6	7.69
	4 5 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	100.00		2.5	130.00		6.5 2.5 5.5 5.5	100.00		2.5	92.31
	8.12 8.12 8.53 8.53	1.30		618 1.5 2.0	0.000		618 1.5 1.5 2.0	100.00		2.5 2.5 2.5	15.35
16/10PM	6.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	12.05	16.716CM	£ 4.31	56.00 100.00	~6/160M	11.5 11.5 11.5	100.11	. 6/106-1	5.01	53.15
47 GU-4,	678	61.04	FXISTERT GUY,	6.5 1.0 1.0	50.00 50.00	EXTSTENT GUM,	678 1.01	17.77	EXISTENT GUS.	1.5	23.00.
FXISTENT 6	0.0 1.0 1.0 1.0 1.0	22.03		2001	5000		8 . O. R.	1111		0.03 LEO	
DISTRICT 5	0.0	2.60	DISTRICT 6	0:0	0.00	CTSTRICT 7	0:0		DISTRICT 8	0:	0.00
10		F0.47	10		PO P			5 t 1	10		PCNT PCNT ACUM

ES 66	MISSING VALUES	0.00 KEPORTS	ES 162	HISSING	4.14 KEPORTS	ES 227	MISSING	9.56 REPORTS	ES 56	HISSING	6.67 KEPORTS
SAMPLES	,		SAMPLES		5	SAMPLES	,	8	SAMPLES	,	5
S		PKCNT OF	v,		PRCNT	<i>S</i>		PKLNT	vi		PRCNT OF
.99			169.			251.			60.		
EFORT	.500	100.00	PEPORT	51k	100.00	KEFORT	6TK	100.00	REPORT	. 500	100.00
.033 H	618 .450 LEQ .500	100.00	9 280.	67R • 450 LEO • 500	100.00	¥ 540.	67x 145. 160	100.00	920	67R . 450 LEQ	100.001
SIGHA	618 • 496 • 456	100.00	SIGMA		100.00	SIGHA	17. 1.50 1.51	100.001	SIGMA	648 1.40 1.50	160.001
030 81	.350	100.00	S 070.	. 350 LEO	100.00	048	. 350 LEG	100.00	.028 SJ	.350 LTO LTO	100.00
HEAN	.330 LEQ .350	00.001	1E AN	.300 LEU .350	100.00	FAN	.390 LEG .350	100.001	AEAN	.300 Le 0 .350	100.00
ŧ	. 250 Ltd . 300	100.001	•	. 256 LEQ . 300	100.00	,	67h .256 LEQ .306	10.001	Ŧ	67R .256 LEQ .306	130.00
	250	1.52		6.8 .200 L10	10.00		250	95.66		.200 150 150	100.00
FFFCEN	.159 .159	3.00	FECENT	618 -150 LEG	1.05 31	FERENT	.150 .150 .236	2.64	FFF CENT	67k 150 160 .200	169.00
461661	25.50	3.03.66	19138	618 150 160	11 5.79 94.15	#E16H	67 F	7.03	#E1681	61. 1100 1100	100.00
suru.		1.52	Surve,	745. 1011.	11.11	sara,	57. 1.00. 1.00.	21.50	SULFUE,	67F 0.350 1.00	100.001
1.101.	676 0.000 1.50	93.94	2 10TAL	678 6.400 150	70.63 80.25	3 10146	67.6 0.000 1.60	153 67.40 67.40	4 TOTAL	0.000	91.07
FISTRICT 1	C. 000	0.00	DISTAIC 2	0.00	. 652	DISTRICT 3	00.3	0000	DISTRICT 4	9.000	
2.7		FE ST FC NT	10		PONT	01.0		FRED FONT ACU	013		FRED PCUT

SAMPLES 61	MISSING	20.78 17 OF REPORTS	SAMPLES 2	VAL UES	PACNE OF KEPORTS	SAMPLES 8	MISSING	11.11 I CF KEFORTS	SAMPLES 15	HISSING	11.76 IT OF REPORTS
.77.		PRCNT			PAGN	oi		PECNI	17.		PRCNT
REPORT	61k	100000	KEPURT GTR	006.	100.00	REFORT	S. S	3.00	PEFORI	مان. 500	103.00
.060 RE	618 • 450 LEO • 500	0.00		. 500	130.00	.030 RE	618 • 450 LCO • 500	100.00	.023 FE	61x • 450 LEQ	100.00
SIGHA	612 • 496 • 450	10.001	SIGMA	1 F G C C C C C C C C C C C C C C C C C C	1.0.00	SIGHA	618 • 406 - 456	100.00	SIGHA	6:R • 460 LLG	100.00
IS 640.	. 350 1.00 1.00	100.00	.045 SI	. 353 L.G . 403	103.00	.678 SI	618 .350 LEQ	100.00	.0.4 SI	678 • 350 • 483	100.00
HE AN	67R .330 LEG .350	100.00		.300 LEO .350	100.00	HEAN	618 •300 LEQ •350	100.00	4E AN	F. 6. 4. 5. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	100.00
#	6.8 .256 .303	1.64	₹ 15	.300	300000	ž	.250 .300	100.00	¥	.25. LEQ .306	100.00
	67.F 1.20 1.20	1.64 53.36	115	.250	100.00		. 230 L. 0 L. 0	100.00		67 F 1 2 0 C C C C C C C C C C C C C C C C C C	9.00
FFUENT	67K .153 LEQ	8.20	FEACENT GTR	.150 LEQ .200	00.00	FET CFA	67% • 150 LEQ	100.00	EC.C.NT	678 • 150 LE 3	100.00
WEIGHT F	.150	66.52		.15c	130.00	451667 6	1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	100.00	WEIGHT F	1.15	100.00
SULFU.,	678 67.0 1.00	3.20	Strev.,	.15c	100.00	Strfuk,	.150	100.00	surfue,	67 N 1950 170	6.67 100.001
TOTAL	67.6 1.000 1.000	80.33		0.000 LEQ .050	100.00	TOTAL	000.0 000.0 000.0	12.53	LOTAL	0.00 0.00 0.00 0.00 0.050	93.33
DISTRICT 5	0000.0	0.00	DISTRICT 6	000.9	0000	DISTRICT 7	000.0	0000	DISTRICT 8	LEG 0.000	0000
018		PPED PCNT ACUM	210		FE ENT	018		PONT	810		PR P

MISSING VALUES

MISSING VALUES

P. C.

Table XII. Mercaptan Sulfur

PC EN

FE ES

FP ES

77. SAMPLES 54	MISSING	23 29.87 PHUNT OF REPORTS	2. SAMPLES 1	MISSING	50.00 PRONT OF REPORTS	9. SAMFLES 2	HISSING	77.78 PRCNT OF REPORTS	17. SAMFLES 10	MISSING	41.16 FACNT OF REPORTS
KE PORT	. 0010	100.00	180436	. 0010	100.00	FORT	. 0010	100.00	FEPORT	. 0010	100.00
. 90035 Kc	.0009 LEG .0010	38.89	98 66000	.0009 .E00	100.00	20000	618 .0009 LEQ	100.00	.0004 FE	67k .0009 LEQ	100.00
SIGNA .	.0006 .0006	0.00	SIGMA 0.J	.003A	0.00	4 4 5	. 0000 LEG	100.00	SIGMA .0	618 .0038 .EG	100.00
. 1006 SI	.0397 LFG .0308	0.00	15 0100	.0000 .0000	0.00	0005 SI	67K 10007 1E0	100.00	.0001 SI		100.00
4EAN .	.0006 1000 1000	6.00	4E AN .	67R . 3386 LEG	0.000	1E AN	61 K 1696 150	190.00	HEAN .	674 .0006 LEQ	100.00
#	.0005 Lt 0	3.76	Ŧ	67R .0005 .160	999	4	.0005 LEO	100000	£	678 .1005 LLO	100.001
	2000	3.70	F N	4000.	0.00 0.00	, V 200	61.F 00004 150	0.00	CENT	9000 1000 1000 1000	0.00
METGHT PETCENT	678 0003 180	5.50	MEJ GH F PEC	. 9003 11E 9	0.00	9 1- H3	0003 160 160 1000	100.00	HEIGHT PEF	616 0003 LEQ	10.0001
	.0002 LFG .0003	0 P W		. LEG		SULFUR, NET	2307.	100.00		. 9902 LF G	100.00
TAN SULFUE	67k - 2301 - 2012	11.11	TELA SULFUR,	.0301 .0301 .0302	9.00		67 P . 00 U1 . 150	50.00 100.00	TAN SULFUE	67.P .0001 LFQ .0002	20.03
HERCAPTAN	0.030	3.70	**************************************	0.0900 LF0	0.00	. MERCAPTIN	0.000 LEQ LEQ	55.00	DERCAPTAN	3.000	90.00
DISTRICT S	900000	0.00	PISTRICT 6	0.0000	0.00	DISTRICT 7	1.3800	0.00	DISTRICT 6	0.000.0	0.00
i		FO ST FC NT AC UM	12		FP ED FOUN	10		A U.M.	10		PER

99	9	21 S	165	9	37 44 415	245	9	2.39 ORTS	52	9 2 3	333
6. SAMPLES	MISSING	0.00 PKCNT OF REPORTS	SAMPLES	MISSING VALUES	2.37 PAUNT OF REPORTS	SAMPLES	HISSING	2.3 PECNT OF REPORT	D. SAMPLES	HISSING VALUES	13.3 PRCNT OF REPORTS
REPORT 66.	3.0 3.0	100.00	REPORT 169.	3.0	100.00	REPORT 251.	3.0 3.0	100.00	PEFORT 60.	3.3	100.00
.22 RE	2.5 LEQ 3.0	1.52	.25 RE	61R 2.9 LEO 3.0	5.45	.24 76	618 2.9 LEQ 3.0	5.31 100.00	.24 86	67R 2.9 LEG 3.0	5.77
SIGMA	618 2.6 LE0 2.9	15.15 98.46	SIGHA	67R 2.8 LEG 2.9	7.88 94.55	SIGHA	61R 2.0 LEG 2.9	11.84	SIGHA	678 2.6 LEG 2.9	5.77
2.6 S	61R 2.7 LEG 2.8	9.09 83.33	2.6 S	2.7 LEG 2.8	9.03 36.67	2.6	678 2.7 LEG 2.8	13.834 62.86	2.6	678 2.7 LEO 2.8	15.38 58.45
HEAN	678 2.6 LEG 2.7	13.64	HEAN	678 2.6 LEG 2.7	28 16.37 77.55	HEAN	618 2.6 LEG 2.7	15.59 68.90	1E AN	67.6 2.6 LE0 2.7	13.46
τ	67R 2.5 LEG 2.6	17 25.76 60.61	z	61k 2.5 LEQ 2.6	25 15.15 60.61	r	61R 2.5 LEG 2.6	15.34 44.39	•	2.5 LFQ	15.38
	678 2.5 2.5	7.58		67 R 2.5 2.5	6. 46 45. 45		6-1 10-4 2-5	25 11. 43 33. 60		2.5 2.5	11.54
<b>v</b>	2.3 Lf 0 2.4	16.61	S)	67K 2.3 LFQ 2.4	25 15.15 36.97	<i>U</i> ,	2.3 1.0 2.4	7.76	<b>V</b> 2	616 2.3 LEO 2.4	15.3¢ 32.69
SSURE,L	61+ 2.2 LEG 2.3	9.19	FRE SSURE ,L	2.2	9.05	Ε,	2.5 LFG 2.5 2.5	14.69	PRESSURF, LES	677 2.5 LEG 2.3	5.77
VAFOR PPE	2.5 2.5	6.06		2.5 1.62 5.5	3.48 12.73	RFID VAFOS EDESSUE	518 2.1 LEU 2.2	5,31 10,20	VAFOF PR	678 2.1 1.50 2.2	7.69
CIBS	61R 2.5 1.50	1.52	HEID VAFOR	618 2.0 LEG 2.1	3.64		2.0 150 2.1	10 4.98 4.90	0139	67.5 2.0 LE 0 2.1	3.3.0
DISTRICT 1	2.0		DISTRICT 2	2.0	. 61	UISTRICT 3	2.0	200	DISTRICT 4	2.0	00000
10		FRED FOUT ACUM	10		PC NT AC UK	10		FRED PCNT ACUM	10		PC NT

SAMPLES 76	MASSING	1.30 PACNT OF REPORTS	SAMPLES 2	HISSING VALUES	0.00 PACNT OF REPORTS	SAMFLES 9	HISSING	0.00 PRCNI OF NEPORTS	SAMPLES 14	MISSING VALUES	3 17.65 PRCNT OF REPORTS
REFORT 77	3.0	100.00	REPORT 2	3.0	100.00	PEPORT 9	3.0 3.0	100.00	REFORT 17	3.0	00.00
.24 FE	67.8 2.9 LE0 3.0	100.00	•14 RE	61R 2.9 LEG 3.0	100.001	.19 PE	618 2.9 LEQ 3.0	0.001	.17	514 2.9 1E0 3.0	100.00
SIGNA	616 2.6 LEG 2.9	13.16 98.66	SIGMA	618 2.6 LEG 2.9	100.00	SIGHA	6TR 2.6 1.60 2.9	100.00	SIGMA	15.0 2.0 2.0	100.00
2.6 SI	67 k 2.7 LEO 2.0	9.21	2.7 SI	6.1R 2.2 2.0	50.00	2.6 SI	67R 2.7 1.50 2.8	22.22	2.5	61 R 2.7 LEG 2.8	7.14
MEAN	618 2.6 LE0 2.7	14.47	HEAN	61k 2.6 LEG 2.7	0.00	4E AN	678 2.6 LE0 2.7	33.33	AEAN	618 2.6 LE0 2.7	14.29
¥.	61k 2.5 LEQ 2.5	17.11	Ŧ	61R 2.5 LEQ 2.6	50.00	¥	678 2.5 1.50 2.6	22.22	÷	618 2.5 Led 2.6	21.43
	2.5 1.5 2.5 2.5	14.47		2.5 1.50 2.55	00.00		67 k 2 · 4 L r 0 2 · 5	22.22		2.5	14.29
S	678 669 200	11.84 30.26	6	22.2 1.50.3	9.00.0	ů;	25.3 1.5.4.5	11.11	V)	618.2 2.4.5 2.4.5	21.43
SSUPF, LE	61 t. C. C. C. C. 3	18.42	350cs	67. LF0.2	0.00	Sauce, LB	671 2.2 LE 0 2.3	9.50 11.11	7, 1000010	2.5.2	21.43
VAFOR PRESS	67.5 1.2 2.5	2.67	VAFOF FRES	67.5 2.5 2.5	3.30	PETD VAFOR FRESS	67.8 1.53 2.5	11.11	VA.F.0 072V	2.53	7.14
4 EID	518 2.0 1.50 2.1	5.25	2	2.5 2.0 1.00 2.1	00.00		67 k 2.0 2.1	00.00	SE TD	67.5 1.50 1.50	0.00
DISTRICT 5	LFG 2.0	1.32	DISTRICT 6	2.0	0.00	DISTRICT 7	LE0 2.0	0000	DISTRICT 6	2.0	0.00
0.7		AC UT	10		FLAT	10		FE FO FCNT ACUM	10		FOR FOR

. SAMPLES 66	HISSING VALUES	PACNI OF REPORTS	SAMPLES 162	MISSING	PECNT OF REPORTS	SAMPLES 227	MISSING	24 9.56 PACNT OF REPORTS	SAMPLES 56	MISSING	6.67 PHCNT OF REPORTS
REPORT 66.	43.9	100.00	PEFORT 169.	7.53 4.53	10.00	REFORT 251	43.9	1,00.00	KEFUNT 60	9.53 9.53	1000.00
.1	43.9	100.00	:	43.8 43.9	1.23	7	618 43.6 170 43.5	160.00	7	618 43.8 43.9	100000
SIGHA	678 43.7 LEG 43.8	12.12	SIGHA	43.7 LE0 43.8	5.56	SIGHA	67 K 43.7 LEG 43.6	6.17	SIGMA	618 43.8	100.00
\$ 9.54	678 43.6 LEG 43.7	33 50.03 87.68	43.6	678 43.6 43.7	37.04 93.21	43.5	43.0 LEG 43.7	12.33 53.33	43.5	618 43.6 43.7	20.36 100.00
1E AN	67 H 43.5 613.5 43.5	22.73 37.84	Z B B B	43.5 LEG 43.5	29.63	1E.AN	43.5 43.5 43.6	39.21	Z	43.5 43.5 43.5	41.07
•	618 43.4 110	15.15	•	1.63. 1.63. 1.63.	12.35 26.54	Ť	618 43.5 43.5	29.07	÷	63.K	21.43
MJ/KG	6.5.3 7.5.3 7.5.3 4.5.3	6.05	MJ/KG	43.3 1.50 4.3.4	10.49	MJ/KG	67 F 43.3 1.0	9.65	MJ/KG	6.18 4.3.4 4.3.4	7.14
(CALL D)	5.53	1.52	4(CD)	43.2 LEQ 43.3	3.76	(CALED) M	43.2 LEG 43.3	3.52		43.3	0.00
S.	43.5 43.2		TION (CALCO)	67.8 43.1 12.0 43.2	0.00		4 4 3 . 1 . 2 . 5 . 5 . 5 . 5 . 5 . 5 . 5 . 5 . 5	0.00	CTION (CALCO)	43.2	0.00
F COMBUST	3513	562	S04303	0.577	9.00	MOTESON OF TON	41.1	0.00	CF CONSUST	676 43.0 43.1	0.00
D 14.14	678 150 150 43.0	386.3	HEAT 0	42.3 12.0 43.0		HEAT 0	9 5 5 5 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6	9.000	4	618 42.9 LE0	0000
STRICT 1	42.9	00.0	DISTRICT 2	42.9	0.00	DISTRICT 3	42.9	000.0	STRICT 4	42.9	9000
10		FPED FCNT ACUM	2		FE EO FCNT	0		FLED FCNT ACUM	10		FRED

Table XIV. Heat of Combustion

STSTEICT 5	FEAT UF	F COMPUS.	ווא נפורט)		MJ/KG	346	HEAN	43.4 S	SIGHA	.1 KE	KEPORT	.77	SAMPLES	61
	A 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	95.55	67° 43.1 43.2	43.2 43.3 43.3	6.5 6.3.3 6.3.4 4.3.4	618 43.4 LF0 43.5	61 R 43.5 LEG 43.6	67.8 43.6 43.7	618 43.7 LEG 43.8	67R 43.0 LED 43.9	618 43.9		MISSIN	9 2 3
	0.00	0.00	0 m	21.33 31.15	25.51 cf.66	19.67	13.11 93.44	6.55	10.00	100.001	100.00	9 7 7	20.16 20.78 T OF REPORTS	16 76 27 S
9	HEAT OF	F CUMPUST	ICM (C	אורטן און	MJ/KG	*	A	2.6 5	SIGMA	7	FPORT		SAMPLES	(V
	25.0 2.0 2.0 2.0	%.c.,	67 F 4.3.1 4.3.2	67× 43.2 43.3	10 10 10 10 10 10 10 10 10 10 10 10 10 1	674 13.4 180	64.8.5 43.6	678 45.6 LEQ 43.7	618 43.7 LEG 43.8	648 43.6 43.9	618 43.9		HISSING	9 11 (9
	00.00	9.00	90000	0.00	0000	9000	0.00	100.00	100.00	0000	100.00	PRCNI	0.00 T OF REPORTS	200
~	HEAT OF	F C7F3US7	TON (CALTO)		MJ/KG	4'	TA N	43.6	SIGMA		FEFCRT	•	SAMFLES	a
	677 42.9 42.9	65.75 3.05 1.05	676 43.1 650 43.2	2 1 1 4 6 0 8 8 0 8	677. 63.3 43.4	63.8 43.4 43.5	67.8 43.5 43.5	618 43.5 LE0 43.7	43.7 43.7 43.0	4 3 . 8 . 8 . 8 . 9 . 9 . 9 . 9 . 9 . 9 . 9	6TA 43.9		HISSIN	9
		0.00	000	0.00	.0	3000	0000	100.00	160.00	100.00	1000	F 60 x	11.11 T OF REPORTS	-112
10	HEAL OF		TON (CALCD)		MJ/KG	4	1E AN	43.6	SIGHA	0.	REPURT	17.	SAMPLES	1.5
	67.8 42.9 LED 43.0	6.184 6.084 6.1.	43.2 43.2	618 43.2 43.3	67. 63.3 43.4	618 43.4 43.5	67.8 43.5 LED 43.6	678 43.6 LL0 43.7	43.7 LE0 43.8	43.8 43.8 43.9	67.k 43.5		HISSING	S Z
	0.000	0.00	30.0		000.0	000	73.33	26.67	100.001	100.00	0.00	Phon	11.76 T OF REPORTS	276 815

SAMPLES 66	MISSING	U.30 PRCNT OF REPORTS	SAMPLES 167	MISSING	1.18 PRCHT OF REPORTS	SAMPLES 230	MASSING	21 8.37 PRCNT OF REPORTS	SAMPLES 60 MISSING VALUES	DRCNT OF REPORTS
REFORT 66.	67.8 25.0	100.00	LPORT 169.	6Tk 25.0	100.00	KEFORT 251.	616 25.0	100.00	FEFORT 60. GTK 25.0	0000
2.43 RE	67R 22.5 LEQ 25.0	00.001	4.15 FL	67R 22.5 LED 25.0	100.00	2.74 16	618 22.5 LEQ 25.0	100.00	3.40 RE 6TR 22.5 LEQ 25.0	100.00
SIGHA	67R 20.0 LE0 22.5	100.00	SIGHA	61R 20.0 LEG 22.5	100.001	SIGHA	618 20.0 LEO 22.5	100.00	16#A 6TF 20.0 LEG 22.5	100.00
11.9 S.	618 17.5 LE0 20.1	1.52	10.3	17.5 17.5 120	3.59	11.0	21.5 20.0	2.61	10.5 GTR 17.5 LEO	100.00
N A	15.0 LE0 17.5	99.69 84.89	NA S	678 15.0 LLG 17.5	7.19	4. AN	67R 15.0 LEG 17.5	12.17 96.96	12 0 5 1 1 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	16.67
T	14.5 15.0 15.0	26.79 89.39	•	67.8 12.5 LEQ 15.0	0,000	,	67K 12.5 LFQ 15.0	18.74	647.8 180.0	60 M M M M M M M M M M M M M M M M M M M
	120. 120. 120. 120.	60.01	- Z	110.3	16.17	. Ta	13.0 12.0 12.5	32.17	7.04 7.04 7.071 7.071	***
O E	1.5 1.5 1.0	19.15	UP PERC	61.6 1.60 11.6	55.93 59.25	Urt PER	678 7.5 1.60	33.91	61. 61. 10.0	26.33
EM", VULUEE	5.6 LEG	42.0	. W.L	7.5	23.35	E (* ) 101	5.0 1.5 7.5	9.5	674 674 5.0 LF 0 7.5	* * * * * * * * * * * * * * * * * * *
TTE COLD	5.00	0.00	TTC CONT	2.5 2.5 5.5 5.5	100	110 001	2.5		67.5 67.5 67.5 163.5 5.0	00000
1 4×0 PF	5.50 2.50 2.50 2.50	2000	2 at 04AT	61. 6.0.3 7.5.5	0000	3 (10-011	170 170 2.5	00000	24 0 0 1 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	630
DISTALCT	999	0.00	DISTRICT	0.0	0.00	DISTRICT	3,5	00.0	DISTRICT	00.00
0.1		AC UT	10		FE SO	10		PC P	5	PC PC PT PC PT

Table XV. Aromatic Content

SAMPLES 63	MISSING	14 18.18 PACNT OF REPORTS	2. SAMPLES 2	MISSING	0.00 PKCNT OF REPURTS	SAMPLES 9	MISSING	0.0 0.0 U PACNT OF REPORTS	SAMPLES 17	MISSING VALUES	0.00 PHENT OF REPORTS
2.28 KEFORT 77	GTR GTK 22.5 25.0 LEQ 25.0	0 0 0 0.30 C.00 100.00 100.00	76 KEFORT 2	67K 67R 22.5 25.0 LEO 25.0	0.00 0.001	2.13 REFORT 9	6TR 6TR 22.5 25.U LEQ 25.0	0.00 0.00 100.00 100.00	.37 HEPORT 17	6TR 61n 22.5 25.0 LEO 25.0	0.00 0.00
SIGHA 2.	GTR 20.0 LEO 22.5	100.00	SIGHA.	6TR 20.6 LE0 22.5	0.00	SIGMA 2.	67R 26.0 LEO 22.5	100.00	SIGHA 1.	6TR 20.0 LE0 22.5	100.00
12.7	67R 17.5 LEG 20.0	100.00	14.4	61R 17.5 LEQ 20.0	0.00	10.5	618 17.5 LEG 23.0	100.00	12.3	61R 17.5 LEO 20.0	100.00
HE AN	678 15.0 LEG 17.5	5 12.70 0 100.00	1E AN	613 15.0 LEG	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1E AN	678 15.0 LEG	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	HEAN	61R 15.0 LEO 17.5	100.00
	67R 0 12.5 LEQ 5 15.0	25 6 39.68 2 87.30		6TR 12.5 LEQ 5 15.0	100.0		67K 12.5 LEQ 5 15.0	1000		618 12.5 LEQ 5 15.0	47.06 4 100.00
PERCENT	61F 5 10•0 1E0 0 12•5	1 3n.19 6 47.62	PERCENT	67R 10. 1.E.0		PENCENT	616 114.0 12.5	68.85 1 100.00	PENCENT	5 110.0 17.5 17.5	41.1
VOLUME PE	6TR 7.5 LEQ 5 10.0	17.46	VOLUME PE	67. 7. 160	0.0	VOLUME FE	618 7.5 LEO 5 10.0	0.00	, VOLUME PE	67K 7.5 160 5 10.0	11.7
	616 5 5.0 1 LEG	0.00		618 5 5.0 1.0 0 7.5			5 5.0 LF0 0 7.5	1 0.00 1 11.11	NTENT, V	5 5.6 LEO	3.0
AROMATIC CONTENT	67.8 3 2.5 1 Lego 5 5.0	00.00	ARONATIC CONTENT	61R 2.55 1.60 5.0	0.0	AROHATIC CONTENT	67F 2.55 1 LF0 5 5.0	11.11	AROMATIC CONTENT	67.8 2.55 5.50 5.0	6.90
2	618 0.0 0.150 0.2.5	00 00 00 00	9	678 3.0 1.50 2.5	00.0	~	518 0.0 0.0 0.0 2.5	00.0	w	67.8 6.0 6.0 2.5	.0.00
DISTRICT	0.0	FRED PCNT 0.00	DISTRICT	LE0	FREG PCNT 0.00 ACUM 0.00	DISTRICT	0.0	FRED CONT O.00	DISTRICT	0.0	FERD FORT OCUM

SAMPLES 66	HISSING VALUES	0.00 PRCNI OF REPORTS	. SAMPLES 166	NISSING VALUES	1.76 PEUNT OF KEFORTS	SAMPLES 228	MISSING	23 9.16 PHONT OF REPORTS	SAMPLES 55	MISSING VALUES	9.33 PRCNT OF REPORTS
REPORT 66.	4.6 9.6	100.00	9EFORT 169	5.0	100.00	REPORT 251	5.0	100.00	KEPORT 60.	5.0	100.00
.31 RE	67k LEQ 5.0	100.00	94.	618 4.5 LEG 5.0	100.00	;	618 LE0 5.0	100.001	.24 KB	618 LEO 5.0	100.00
SIGHA	61 8 LEG 6 4 . 5	100.001	SIGMA	15.00 1.00 1.00 1.00	100.00	SAGHA	FE . 5	100.00	SIGNA	678 LE0	100.00
.9	678 3.5 Lt.0	100.00	6.	4.5.5.4.	100.00	•	4.0.5 4.0.5	103.00	9.	67. 8.50 4.00	100.00
4E AN	3.9 LE0	100.00	HEAN	61k 3.0 1.50 3.5	100.60	HEAN	83.0 8.5	100.001	NA	6TR 3.1 LEG 3.5	100.00
Ť	618 2.5 3.0	100.00	Ŧ	677 2.5 LEO 3.0	30.00	Ť	618 2.5 1.60 3.0	99.56	t	61R 2.5 LEQ 3.0	10.000
	61.5 1.50 2.50 2.50	109.00		67.F 2.0 1.50 2.5	2.41		3.5°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°	98.62		616 2.0 1.50 2.5	100.00
1430 133	618. 1.5	3.03	FENCENT	8 1 2 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	6.02 5.02 36.99	FEP CENT	67R 1.5 1.5 2.9	3.07	PERCENT	618 1.5 2.0	100.00
, verune	2.4.	16.67 36.97	. VOLUME	11.5	15.25 19.26 90.96	, VOLUME	1.0	6.53	, VOLUME	645 1.0 1.5	1.82
CONTENT	5.03. 1.03.	806.67	COMTENT	6.1 1.0	73.98 71.69	CONTENT	61.0 LEQ 1.0	135 53.65 88.16	CONTENT	67.8 LE0	32 56.10 98.18
CLEFIN	8.00 1.00 S.	13.64	OLEFIN	678 9.0 LEO	26.51 27.71	OLEFIN	0.0 0.0 1.0 2.	27.63 26.51	OLEFIN COM	678 000 150 5.	36.36
UTSTRICT 1	0.0	000	DISTRICT 2	9.0	1.20	DISTRICT 3	160	0 0 0 · ·	DISTRICT 4	LE0 C.0	3.02
UT.		PP ED AL UM	01.0		PO NT	10		PC NT	10		PC NT

151	DISTRICT 5	OLEFIN	LOSTENT	, VOLUME	De. CE 11		T	HEAN	.9	SIGMA	.32 6	FLFORI		SAMPLES	62
-	0.0	9.0 0.0 0.0 0.0 0.0 0.0	678 1.0	11.6 11.5	518 1.5 1.60 2.8	2.5 2.5	618 2.5 160 3.6	3.5 3.5 3.5	8.5.5.4 0.4	618 LEG 4.5	61R 4.5 LED 5.6	6TR 5.0		MISSING	SING
	0.00	20.07	64. 525. 4. 525.	55.55	4.84	6.00	300.00	100.00	1.00.00	100.00	100.00	100.00	PRCNI	19.48 17 OF REPORTS	7. T. S. T. S.
-	DISTRICT 6	6 OLEFIN	COUTENT	, volum	173033a 3		=	HEAN		SIGHA	0.00 R	REFORT	2.	SAMFLES	-
	9.0	0.00	6. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		612 1.5 LL0 2.0	6:5	618 2.5 LF0	678 3.0 LEG 3.5	3.5 1.1	618 LEG 4.5	61R 4.5 LEO 5.0	5.0 5.0		HISSING VALUES	S
	0.00	100.00	100.001	110.00	100.00	00 · un t	100.001	100.00	0.00	30.001	0.000	100.00	Pro	50.0 PRIONT OF REPORT	50.00 PORTS
1	DISTRICT 7		OLEFTN COUTENT	, עמננ	F PEFCENT		•	4E AN	.5	SIGMA	.2u R	REFORT	;	SAMFLES	σ
	9.0	67.00	1.00	617 LEC 1.5	676 1.50 2.0	61.6 CE 0 2.5	61k 2.5 LF0 3.0	674 3.5	3.5 2.01	6-1x 1 + 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	67k 1.5 5.0	5.0		MISSIN	SER
	0.00	0 0 0 0 0 0	11.11	000000000000000000000000000000000000000	100.000	100.00	100.00	100.10	169.00	100.00	100.00	100.00	PRCNI	OF REP	08.0 08.1 00.1
ST	DISTRILL	OLEFIN CON	CONTENT	י יייייייייייייייייייייייייייייייייייי	PERCE T			4E AN		SIGMA	74.	E+081	17.	SAMPLES	17
	9.0	678 1.E0 1.E0	100.0	1.5 1.5 1.5	67.8 LF0 2.0	2.5	5.5 8.0 8.0 8.0 8.0	574 3.0 1.0 3.5	8.8 8.5 1.0	61 x	67R 4.5 LEO 5.0	5.6 5.6		LISSING	SING
	0.00	76.47	11.76	11.76	0.00	100.001	3.90	100.00	100.00	100.00	0.00	0.00	PACNT	0.00 11 OF REPORTS	8 1 S

SAMPLES 62	MESSING	6.06 PRCNT OF REPORTS	SAMPLES 142	MISSING	27 15.96 NT OF REPORTS	SAMPLES 223	MISSING	28 11.16 NT OF REPORTS	SAMPLES 59	MISSING	1.67 NT OF REPORTS
.99		PRC	169.		PRCNT	51.		PRCNT	.09		PRCNT
PEPORT	15.10	100.00	PLPORT 1	6TK 15.10	100.00	REPORT 2	6TR 15.10	100.00	PEFORT	6TR 15.10	100.00
. 19 P	61k 14.95 LE0 15.10	10(.00	.27 P	67K 14.95 LEG 15.13	100.00	.17	GTR 14.95 LE0 15.10	100.00	.22	6TR 14.95 LEQ 15.10	100.00
SIGHA	14.8 LE0 14.95	100.00	SIGHA	678 14.80 LEG 14.95	100.00	SIGHA	14.8c	100.001	SIGHA	678 14.86 LEG 14.95	0.00 100.00
14.45 51	618 14.65 LEG	4.84	4,4,	67K 14.65 LE0 14.80	20.42	14.32 5]	14.65 LE0	3.14	S 07 .,	67R 14.65 LC0	0.78
1EAN 14	618 14.50 LEQ 14.65	32 51.61 95.16	4E AN 16	618 14.50 16.0	40.85 79.58	JEAN 1	67R 14.5U LEG 14.65	6.73 96.86	1E AN 1.	678 14.50 LEG 14.65	36.90
#	14.35 14.50	16.13	ŧ	67.8 14.35 LEO 14.50	26.13 76.73	¥	LF 0	90.36	#	678 14.35 LEQ 14.50	15.25
	671 14.2 LEG 14.35	14.52		616 14.20 150 14.35	5.63		14.20	26.70		67 P 14.20 160	10.95
(CALCO)	61k 14.05 Lt 0	6.45 12.90	(CAPE D)	618 14.05 LE0 14.20	10.56	(CALTO)	678 14.05 14.20	12.56 21.08	(0770)	615 16.05 160 14.20	16.95 22.03
	13.90 LEG 14.05	000	_	670 13.90 15.0	7.75		13.07 LEO 14.05	\$ 25.5		675 13.0% LEG 14.05	5.00
HAUBUGEN	676 13.75 13.90	0.00	HYDROGE	676 13.75 LEO 13.91	3.52	H70806F	678 13.75 18.0 13.90	2.22	HYUROGEN	677 13.75 LF0 13.90	0.00
FENCEN	61.8 13.63 LE 2 13.75	00.00		616. 13.60 15.75	2:13	PERCHI	678 13.63 15.75		PERCNI	13.60 13.75	30.00
DISTRICT 1	LE0 13.66	0.00	DISTRICT 2	13.60		DISTRICT 3	13.60	000	DISTRICT 4	LEQ 13.60	0.00
0.10		FEREN	10		FP EG FC NT AC UM	20		PC NT	10		PC NT AC UM

SAMPLES 59	HISSING	23.38 OF REPORTS	SAMPLES 2	MISSING	0.00 DF REPORTS	SAMPLES 9	HISSING	F KEPORTS	SAMPLES 16	HISSING	5.86 OF REPORTS
77. SAH		PKC NT O	2. SAH		PFONT OF	9. SAM		PECNT OF	17. SAM		PRCNI
REPORT	67R 15.10	100.00	REPORT	6Th 15.10	3.00	REFORT	15.10	1.0.00	EFORT	67K	100.00
.22 88	678 14.95 LEQ 15.10	3.00	.13	618 14.95 LEO 15.10	100.001	3 30.	67K 14.95 LEQ 15.10	000	3 20.	678 14.95 LEQ 15.10	10000
SIGMA	618 14.80 LEQ 14.95	100.001	SIGNA	14.86 LEG 14.95	100.00	SIGNA	618 14.40 LEG 14.95	100.00	SIGHA	6TR 14.36 LEG 14.95	100.90
4.10 S1	578 14.65 LEG 14.80	100.00	14.34 SI	14.65 LEG 14.80	100.00	14.50 5	67.8 14.65 LEO	11.11	14.40 83	618 14.65 14.89	100.00
TEAN 1	67 R 14.50 LEO 14.65	5.00	HEAN 1	67.8 14.50 LEO 14.65	00.00	16 AN 1	67.8 14.50 LEG	2 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1E AN 1	618 14.50 LE0 14.65	160.00
¥	618 14.35 LEQ 14.50	16.95 94.92	Ŧ	678 14.35 LEQ 14.50	50.00	÷	618 14.35 LF0 14.50	000	=	678 14.35 Lt0	01.25
	67F 14.20 LEG 14.35	30.51 77.97		14.20	59.00		61F 14.20 LF0 14.35	. 20.0		6. F 14. 20 Lro	18.75
(CALCO)	61 R 14.05 LEQ 14.20	20.34	נכערינו	61F 14.05 LEJ 14.20	.00	ורפונט	618 14.45 16.20	0000	(CALCO)	67R 14.05 LEQ 14.23	
	676 13.90 LED 14.65	8.47		13.90 LF0 14.05	330		13.90 16.0 14.05			13.90 LE0 14.05	30.0
HYDFUGEN	678 13.75 L=0 13.90	13.64	HYDROGEN	678 13.75 LEQ 13.93	0000	HYDRUGEN	616 13.75 LED 13.93	•56	HYDROGEN	678 13.75 13.93	676
PEPCHI	678 13.60 13.75	0000	PFACMI	676 17.60 15.75	0000	FERCNT	67F 13.60 15.75	9.00	PERCNI	13.50 150 13.75	• • • • • • • • • • • • • • • • • • • •
DISTRICT 5	LE0 13.60	000	DISTRICT 6	13.60	0000	DISTRICT 7	LE0 13.60	00000	DISTRICT .	13.60	000
0.15		PC UT	015		PONT PONT PONT	018		FP ED FC NT AC UM	015		PCUM

10	DISTOICT 1	MOKE	F0197				7	YE AN	27.4 5.	SEGMA	3.23 RE	REPORT 66.	. SAMPLES	53.
	16.0	18.0	20.0 120.0 22.0 22.0	22.0 140 24.0	618 24.0 4.60 26.0	678 26.0 1.50 24.0	618 28.6 30.6	67.k 30.0 LEG 32.0	32.0 34.0 34.0	613 34.0 163 36.0	36.0 36.0 36.0	38.0		HISSING
A VIEW	0.00	1.52	3.03	25.76	39.39	10.61	33.33	15.15	1.52	100.00	100.00	100.000	PECNT OF	0.00 REPORTS
10	DISTRIC" 2	CHOKE	PULNT				ā.	1E AN	26.3 SI	SIGHA	3.16 RE	REPORT 169.	. SAMPLES	.ES 165
	18.0	110.0 150 24.0	67.8 23.0 45.0 22.0	27. 22. LEG 24.0	24.0 LEQ 26.0	26.0 28.0 28.0	518 28.0 LFQ 30.0	31.0 32.0	32.0 34.0	618 34.0 LE0 36.0	34.0 38.0	36.0		MISSING VALUES
PCAT	000	9000	. 35	11. 52 16. 76	23.09	13.33	39 53.64	29.70	2.42	1.82	100.001	100.00	PRCNT OF	2.37 REPORTS
10	DISTRICT 3	SHOKE	PUINT				÷	AL	IS 6*12	SIGMA	3.21 PF	REFORT 251.	. SAMPLES	ES 195
	18.0	115.0 15.0 20.0	67 h 21.0 LE 0 22.0	676 22.0 LFG 24.6	24.3 24.3 26.1	255.0 LFO 23.0	22.0 22.0 30.0	57F 30.0 LE0	32.0 130.0 34.0	672 34.0 LE0 36.6	678 36.0 LEQ 36.0	36.0		MISSING
FRED	00.00	9000	1.54	1.74 11.26	22.56 73.85	35,36 69,23	6.67	12.82 98.72	6.67	100.001	100.00	0.000	PKCNT OF	22.31 REPORTS
10	STRICT 4	SHOKE	TVIOO				ž	MEAN	28.1 51	SIGHA	3.23 FE	REPORT 60.	. SAMPLES	ES 58
	14.0	67.8 118.0 20.0	61 R 23.0 1E0	676 22.0 LEC 24.0	24.0 LL0 26.1	676 25.0 1.0 23.0	678 26.0 1.50 39.0	31.0 160 32.0	618 32.0 LF0 34.0	618 34.0 Lto 36.6	618 36.0 160 36.0	318 36.0		HISSING
FPEG FCNT ACUM	00000	00.00	0.00	5.17	27.59	22.41 55.17	16.97	15.52 89.66	1.72	44.65	5.17	100.00	FRCNT OF	3.33 RE PORTS

SAMPLES 66	MISSING	0.00 PACNT OF REPORTS	SAMPLES 167	MISSING	2 1.18 PRCNT OF REPORTS	SAMPLES 246	MISSING	PRCNT OF REPORTS	SP 4P.ES 60	HISSING VALUES	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.99		930	169.			251.			60.		300
REFORT	163	100.00	REFORT	57K 169.	0.00	FEFORT	100°	0.00 180.00	REFORT	100	000.0
6.0 6	67R 97. 160	37.90	7.6 86	67R 97. 160	8.98	6.3	678 97. 100.	10.16	7.6 K	6TR 97. LED 100.	16.67
SIGMA	618 94.	22.73 62.12	SIGHA	678 94. 689	35 20.96 91.02	SIGHA	618 94. 97.	31 12.66 89.84	SIGHA	61R 94. LEG 97.	11.67
8 . 46	67R 91. 94.	18.15 39.39	s •69	618 91. 94.	28 16.77 70.06	•60	678 91. 150	13.11	88.	618 01. 94.	8.33
1E AN	67. 66. 91.	9.09	4E AN	67.8 66. 91.	10.18	1E AN	988. 91.	36.13	YEAN	6TR 88. LF0 91.	63.33
	67.8 65.9	3.03	•	678 688	10.10 43.11	•	678 85.	33,41	<b>y</b>	GTR 85.	26.67 56.67
0	67.5 150 150	1.52	£ 0	676 150 150 85.	0.56 32.03	0.3	67F 82.	6.01	6.0	61 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	30.00
x "OLIFIG	67. 153.	3.03	X MODIFIE	450 450 82.	9.58 23.35	X MODIFIED	618 79. 150 62.	22 6.94 22.36	X MODIFIES	67.8 79.	13.33
ATION INLEX	67. 76. 74.	4.552	ION INCLX	775. 180 79.	5.30	TON INDEX	67. 76. 180	22 00.01	SEPARATION INCOX	617 76. 680 97	3.33
34033	67. 73. 1.50	3.03.	THUNDER	673. 150	6.59 3.33	C E D A F D A	678 73. 160	2.95		17. 17. 16.	5.67
1 WATER	67.4 76. 73.		2 WATER	67.8 70. 73.	1.80	3 WATER	67.6 70. 1.50	1.634	4 HATER	678 150 73.	1.67
DISTRICT	76.		DISTRICT :	70.	00.00	DISTRICT	LEO 70.	0.00	DISTRICT	LE0.	0.00
10		FEFT	16		PC ES FC WAY	10		25 P	0		FF FO PC NT ACUM

Table XIX. Water Separation Index, Modified

77. SAMPLES 75	MISSING	2.60 PRCNT OF REPORTS	2. SAMPLES 2	HISSING	0.0 0.00 PRCNT OF REPORTS	9. SAMPLES 9	MISSING	0.00 PACNT OF REPORTS	17. SAMPLES 17	MISSING	0.00 PRCNT OF REPORTS
REPORT 7	100.	100.00	REPURT	57R 100.	100.00	KEPORT	100°	1.00.00	KEP ORT 1	100.	100.00
5.6 R	67R 97. LEG 108.	13.33	1.4 R	61k 97. LEG 100.	100.00	6.4	61P 97. LEO 100.	11.11	6.5	618 97. LEQ 100.	11.76
SIGMA	618 94. LEG 97.	21.33 86.67	SIGHA	618 94. LEG 97.	0.00 100.00	SIGHA	618 94. 100 97.	0000	SIGNA	678 24. 160	17.65
92. 5	618 91. 94.	24.00 65.33	96.	618 91. 94.	0.00	87. 51	67.8 94.	0.00	67.	618 94.	17.65
HEAN	91.	16.00 41.33	4E AN	618 88. LEG 91.	130.00	1E AN	618 88. 911.	22.22 88.89	1E AN	91. 91.	5.88 52.94
Ŧ	618 85.	13.33	Ŧ	618 85. LFQ 88.	50.00	•	61 × 65 • 8 • 8 • 6 • 6 • 6 • 6 • 6 • 6 • 6 • 6	11.11	Ť	618 85.	0.00
0.7	6.6. 6.5. 6.5.	2.67	0	67F 82. 150	56.00	c	67. 62. 85.	44.	C t	4 5 5 7 4 5 6 7 5	11.76
ATTIOOM X	67. 19. 160	6.67	X FOUTFIE	618 79. LEQ 82.	0.00	X HODIETEN	678 79. LEQ 82.	11.11	X MODIFT	618 79. 150	35.29
ION INCEX	67.6. 16.0 76.	2.67	ION INCEX	67. 76. LEO	30.0	ION INCEX	76. LEO 79.	0.0	13 2	76. 12.0 79.	17.65 35.29
SEPARATION	678 73. LEQ 76.	1.33	SCPARATION	618 73. LEO 76.	0.00	SEPARTION	73. LEO 76.	0.00	SUPAPATION	67. 73. 150	11.76
MATER	67k 70.	0.00	MATER	35.55	0.00	MIEE	618 70. 73.	000.00	£ . E	616 70. 150	5.88.
DISTRICT 5	70.	00000	OTSTRICT 6	70.	000.0	DISTRICT 7	70.	00.00	UISTRACT A	160	000.00
10		FRED FCNT ACUM	10		FP ED PC NT ACUM	10		FF EG PCNT ACUM	I.a		FFED FCUT ACUT

Table XX. Particulate Contaminate

DISTRICT	S	PAPTICULATE OF	CONTAMINATE,	E, MALTTE	1.16	Ŧ	1E AN	. 37 S.	SIGHA	.23 RE	REPORT	77. SAMPLES 76
9.00	6.93 6.93 6.93	67.8 1.30 1.20	616 . 20 LEG	8. c. j.	2001	618 .56 LEQ.	61.F . 60 . 70	67.8 LEG . 80	618 . 96 . 96	618 .90 LEQ 1.00	1.00 1.00	MISSING
0.00	15.79 15.79	15. 77 31.53	23.60 55.26	15.79 71.05	10.53 01.58	2.63	5.26	5.26	2.63	2.63	100.00	1.30 PRCNT OF KEPOKTS
DISTRICT	0	FARTICULATE C	COM ANJRAT	E. "6/11	E	Ť	A P A	.80 8.	SIGHA	0.0u RE	KE PORT	2. SAMPLES 2
0.00	9.0	678 11.0 12.0	45. 13. 36.		67. 04.1 08.	61.8 LE0	674 .60 LEG	6TR 73. LEO . 80	CTR LEG	6TR .90 LE0	1.0 1.0	MISSING
		0.00	333	0.00	0.00	0.00	330	100.00	100.00	100.00	0.00	0.00 PRGNT OF REPORTS
DISTRICT	~	FARTICULATE C	CONTARINATE,	E, +6/LITE	9	ŧ	HEAN	35.	SIGHA	• 26 RE	RFFORT	SAMPLES 8
0.00	6.00 LEO	670 1.50 .20	67: • 2 f LFG • • •	678 LEO 1.40	94.00	677. 1.50	67 4. LEG	61. 61. 68.	F. 3.	678 . 90 1.00	1.00 1.00	MISSING
.00	37.50	37.50	25. fu	0.00	12.50	0.00	25.30	100.00	100.00	100.00	100.00	11.11 PRUNT OF REPORTS
DISTRICT	ø	PARITCULA!E C	CON. AMIPATE,	'E, MG/LIT	12.1	ř	HEAN	s 54.	SIGHA	.25 A	NEPORT	17. SAMPLES 17
0.00	9.00 LE30	676 110 153	67F 6.20 LEC • 30	81.3 06.3	97.0	618 .50 150	6TR . 60 . 70	6 r R		6TR •90 LED 1.00	1.00	MISSING
0.00	9.00	23.53	5.88	17.65	5.68	29.41	5.83	0.00	5.86	5.88 160.00	100.00	0.00 PECNT OF REPORTS

SAMPLES 61	MISSING	7.58 PRCNT OF REPORTS	SAMPLES 162	VALUES	7 4.14 PHLNT OF REPORTS	SAMPLES 227	MISSING	24 9.56 PRUNT OF REPORTS	SAMPLES 60	MISSING	0.00 PACINT OF REPORTS
KEFORT 66.	.026	100.00	REPURT 169.	.020 .020	100.00	FEPORT 251.	6TE • 620	100.00	REPORT 60.	67R • 020	100.00
. 0028 K	678 .018 LEQ .020	100.00		. 620 . 620	100.00	. 0026	618 .618 LEO	100.00	. 0028 F	67R • 018 LEQ • 020	100.00
SIGMA	618 .016 LEG	100.00		.016 .016	100.001	SIGHA	.016 LEG .016	100.00	SIGHA	678 .616 LEG	1,0.00
S +00.	67R • 014 LEG	100.00	.006 S.	.014 LE0 .016	100.001	. 000 S	. 314 LEO . 316	100.001	.006 S	678 .014 LEO	100.00
MEAN	67R .012 LE0	1.64	1E AN	.012 LEG	2.47	HEAN	. 112 LEO . 014	99.56	HEAN	678 • 012 LEO • 014	0.00
*	67k .010 LEG	3.28		.010 LEQ .012	3.09	ī	67x . 616 . 660	2.64	Ŧ	67R • 010 LEO • 012	1.67
	618 150 150	4.03		866.1	14.20		61.F . 0.08 LE 0	8.61 96.04		678 • 006 LF0 • 0119	18.33
**	3000	4.92	¥.	80 35 . 80 35 .	24. 07 61.25	24	. 306 LEO	20.70	7	67R 1.60 1.60	16.67
1:57HOX 54	.074 .074 LEG	14.75	MG KOHZGREN	004 LEG	22.04	NS KOH/6PAM	1.604 1.604	34. 60	NG KOHZGEAN	676 . 304 . 160	73.33
W. Poch	2037	18.03	•	678 LF0 LF0	35.53	Ť	618 -632 LEG	31.72	NOT BER,	. 002 LEO	16.33
ALIO	6.00.	32 52.46 52.46		1.403	444	ACID NU. 37	618 6.00 6.00 6.00 6.00 6.00	25 11.01 11.89	ACIO	67.F 0.000 1.EQ	10.00
DISTRICT 1	9.000		DISTRICT 2	0000	0.00	DISTRICT 3	000.0	200	DISTRICT 4	1.60 3.890	0.00
10		PCNT PCNT	10		FC FG FC NT	10		PC LT	10		PC P

SAMPLES 62	MISSING	15 19.48 PACNT OF REPORTS	SAMPLES 2	HISSING	D.00 PRCNT OF NEPORTS	SAMPLES	MISSING	0.00 PRCNT OF KEPURTS	SAMPLES 16	MISSING	5.84 PRCNT OF REPORTS
77.			2	0	300	σ	3	063	17	,	000
EPORT	.020	100.00	FPORT	.020	100.00	REFORT	6TR .020	10001	PEPORT	. 02	100.00
0030 +6	618 .619 .623	100.001	1 2000	618 .018 LED .U20	100.001	. 0011 H	.020	100.001	. 0024	61K • 018 • 020	0.000
SIGNA .	618 .016 LEG .018	3.00	TEMA	674 .016 	100.001	SIGHA	.016 LEG .016	100.001	SIGNA	618 -016 -018	103.00
.007 SI	.314 .015	0.00	7S 800	. 314 LEG . 016	0.00	. 003 S	618 - 514 - 116	100.00	s 500°	678 .014 .020 .016	100.00
FAN.	.012 LEG .014	3.23	1. AN	67.4 .0112 LEO.	100.00	1E AN	67.8 • 01.2 LEG • 01.4	130.00	JE B N	678 012 LEO	100.00
14	618 1016 1912	6.45	÷	67R .010 .EQ	100.001	•	678 • 614 • 612	0.00	T	676 . 010 LEQ	9.00
		16.13		. 308 1.308 1.20	100.00		671.	100.001		675. C.C.O.S.	6.25
1	950. 980.	19.35	1 4	6. K	160.00	49	6.78 1.10 1.10 1.00 1.00 1.00 1.00 1.00 1.0	100.00	1	677 600. 600.	25.06
, KOHZGI	. 016 . 016 . 016 . 016	22.26 24.64	40 KOB/G	176. 1906.	100.00	r3 K0H/Gr	20.	110.00	€ K0H/5	67 P. LF G	25.00 68.75
i i	7 900	22.54	ND435	2000	53.00		675 00.0 00.0	11.11	4.98.70A	.002 LEQ	12.50
FUTE BURB	618 6.000 1.00	. 00.		67.8 0.000 1.000 500.	50.00 56.00	FUID NORSE	6.50 0.900 1.60	77.79	0104 8	0.000	31.25
Metal.fr		00000	9 13191810		0.000	DISTRICT ?	0.000	600.00	DISTRICT	100.00	0.00
210		FORT	010		FF FG FC NT AC UM	10		PE E PE	10		14 PO 14

9	HISSING ALUES	1.52 PORTS	161	HISSING VALUES	4.73 REPORTS	248	HISSING	1.20 KEPORTS	5.2	MISSING	5.00 REPORTS
SAMPLES	HISSI	9. 3.	SAMPLES	VALU	9. R.	SAMPLES	YALI	OF KE	SAMPLES	MISSI	OF RE
S		r FC N	3		PECNI			PRCNT			PKCNT OF
66.	ن	29.0	169.	. •	98.00	251.	~ ?	210	60.		000
PEFORT	67k 12.6	3.08	PEPUET	6TR 12.0	3.73	REPORT	6TR 12.0	160.10	PEFORT	6Th 12.	100.00
2.2 P	618 11.0 160 12.0	26.96	2.5	67R 11.0 LEG 12.0	.62	2.6 R	6TR 11.0 LEO 12.0	2.05	1.5	6TK 11.0 LEO 12.0	1.75
SIGHA	61 K 10.0 11.0	3.08	SIGHA	678 10.0 LEG 11.0	1.86 95.65	SIGNA	618 10.0 11.0	.31	SIGHA	6TR 10.6 LEC 11.0	0.00
5.7 SI	618 9.0 10.0	4.62 93.85	5.3 SI	678 9.0 16.0	2.48	5.0 SI	9.0 10.0	0.00	5.4 51	67R 99.0	0.00
HEAN	619 0.0 9.0	0.00	HEAN	67.R 8.0 1.E.0 9.0	91.30	(E AN	61P 8.1 9.0	1.61	A B A R	61R 8.0 LE0 9.0	0.00
Ť	F. 2.	1.54	Ē	677	3.73	•	678 6.0 8.0	2.82	Ţ	678 7.0 LEQ	8.77
NIN	6.6 6.0 1.50 7.0	6.15 87.69	z	6-8 6.0 1.50 7.0	9.94	N I	0.5 0.5 0.5	7.26	z I	676	10.53
GALLON, M.	618 6.0	16.92 61.54	GALLON, MI	618 6.9	10.56		618 5.0 6.0	10.89	1 CALLON, Y	618 LF0 6.0	14.04
1 1	616 LEO 5.0	46.15 64.62		2 4 5 7 c	22.98	TIME, 1 GALLON,	67 £ . C . C . S . C . S . C	25.47		6.69	42.11.
TION TIN	673 3.0 1.6.0	13.85	-IL GOLL	6.33	27.33		9.23	6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	SALT MOITS	a	19.30 22.61
FILTRATIO	678 2.9 1.E0 3.6	  	FILTRATION	67.5 1.50 3.0	26 16.15 16.15	3 FILIPATIO	67.R 2.0 1.E.0 3.0	14.11	4 FILTRATIO	57.8 2.0 3.0 3.0	3.51
DISTRICT 1	LE0 2.0	0.00	OISTRICT 2	LEG 2.6		DISTRICT	2.0	2.00	DISTRICT	2.0	000
018		FORT PCNT	010		FFED FCUM	013		PENT PCNT PCNT	07.0		PPED

SAMPLES 72	MISSING	6.49 T OF REPORTS	SAMPLES 2 NISSING	VALUES	0.00 T OF KEPORTS	SAMPLES 6	MISSING	33.33	SAMPLES 16	MISSING	5.08 IT OF REPORTS
.77.		PKCNT			PRCNI	;		PRCNT	17.		PECNT
REFORT	12.0	1.39 100.00	KEPOPT	12.0	100.00	REPORT	12.0	100.00	REPORT	6Th 12.0	3.00
1.6 RE	678 11.0 LEQ 12.0	0.00 98.61	9 5	11.0 LEQ 12.0	100.00	2.9 K	6TR 11.0 LEQ 12.0	0.000	1.8	676 11.6 LEQ 12.0	0.000
SIGMA	678 10.0 LE0 11.0	0.00 98.61	SIGHA	10.6 LEG 11.0	100.00	SIGMA	11.0 11.0	16.67	SIGMA	61.8 10.1 11.6	100.00
4.3 SI	678 9.0 12.0	98.61	7.0 SI	9.0 LEO	100.00	5.2 SI	67 R 9.0 10.0	83.33	5.4 SI	9.001 10.01	100.00
4E AN	678 8.0 LE0 9.0	0.00 0.00 0.00 0.00	JE AN GTR	3.0 9.0	100.00	4E AN	67 K	0.0000	1E AN	9.8 1.60 9.0	0.00
37	61K 7.0 LF0 F.0	36.00	4. 4.	7.0 6.0 8.0	1,0.00	¥	618 7.0 1.70 0.0	93.33	36	61P 7.0 LEO	31.25
z	678	2.78 04.61	2	15.0	100.00		6 8 9 1 5 0 5 1 5 0 5 1 5 0 5 1 5 1 5 1 5 1 5	83.33	2	61.5	r. 00 66.75
GALLUN, MIN	618 5.6 6.9	6.94 95.63	GALLON, MIN	5.0 LEQ 5.1	0.00	GALLON, MI	518 5.3 110 6.0	6 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	GALLON, WIN	5.5 2.5 6.1	25.03
AE, 1 GAL	618 LEG 5.0	33.33	5, 1	6.0 5.0	• • • • • • • • • • • • • • • • • • • •	4F, 1 GAL	67F 4.3 LEG 5.0	3.00	. 1	5.5°	12.50
	7.0.	25.03 55.56	110N 11H	3.0 6.2 9.3 9.3	000	100	61F 3.0 1.50 4.0	63.33	F	1.00 ±	31.25
FILTER, ION	2.0 2.0 3.0	20 27.76 37.56	FILTESTION 618	3.0	000	FILIKATION	67.8 1.50 3.0	00.00	FILTEALION	67.E 2.0 1.50 3.0	12.50
DISTRICT 5	2.0	2.78	STRICT 6	2.6	9000	SIRICT 7	2.6	900	STRICT S	2.0	000.0
OTS		P EC UT	0.15		FF FO FC NT ACUM	DIS		7.00 A C. M. D. J. M.	018		FP EO PC NT

SAMPLES 60	HISSING	22.08 PHCNT OF REPORTS	SAMPLES	HISSING	4 4444 PACNT OF REPORTS	SAMPLES 13	MISSING	23.53 PACNI OF REPORTS
17.		ā	;		ā	17.		ā
EPORT	10.0	100.00	REPORT	10.0	100.00	REFORT	10.0	100.00
.67 REPORT	6TR 9.0 LEO 16.0	100.00	1.33 8	678 9.0 LF0 10.0	100.001	30.	6TR 9.0 LEO 10.0	100.001
SIGMA	67 R	100.00	SIGMA	618 8.0 1E0 9.0	100.00	SIGHA	LEG.	100.00
.2 5.	677 1.60 8.0	100.00	.6	67 R	100.00	1. SI	618 7.0 6.0	100.00
HEAN	678 6.0 7.0	100.00	HEAN	618 6.0 1.0 7.0	100.00	HE AN	618 6.1 7.0	0.00
7	61.8 5.0 LFG	1.0.00	#	6.6 6.0	0.00	¥.	678 5.0 LF0 6.0	100.00
	3.00.00	166.00		6. 6. 6. 6. 6. 6.	103.00		61 E	100.00
	33.5 L. 3.0	100.000		618 3.5 1.60 4.0	10.00		3.5 LED 4.0	0.00
9H 40	671 2.0 1.86 3.0	90.68	9H HC	2.0 1.50 3.0	20.03	0F HG	6.1 6.0 3.0	100.00
DELTA P IN WW OF	11.00 2.00	6.67	FLIA C IN MM	618 1.0 2.0	00.00	F IN HH OF	67P 1.0 LEG 2.0	0.00
	67. 0.1. 1.0	51.67		678 1.00 1.10	20.00	PELTA	67.6 1.0 1.0	60.23
OTSTRICT 5	0.50	88. 89. 33.33.	DISTRICT 7	6.0	60.00	DISTRICT 8	LEG 6.0	30.77
018		PONT PONT PONT	015		PC NT	013		AC UT

Table XXIV. Thermal Stability Tube Color Code

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10	DISTRICT 5		VISUAL PATING				T	HEAN	. 7 s	SIGMA	.45 REPORT	EPOR;	.77.	SAMPLES	0 9
	רבס	618 9.0 15.0	67.3 1.0	67. LEQ.	67.0 1.5 LEQ	6.78 2.6 1.50 2.5	6TR 2.5 LEO 3.0	GTR 3.0 LE3 3.5	3.5 LEG 4.0	618 4.0 LEG 4.5	6TR 4.5 LEO 5.0	61R 5.0		MISSING	SING
PCNT ACUM	26.67 26.67	3.33	68.33 98.33	1.67	3.06 100.03	0.001	100.00	100.00	100.00	100.00	100.00	100.00	ą,	17 22.08 PACNT OF REPORTS	. 17 RTS
5	DISTRICT 7		VISUAL FATING				Ť	4E AN	1.0 s	SIGHA	0.03	KEPORT	;	SAMPLES	ď
	LEO 	6TP 0.0 LEG	67.8 LE 3	1.6 1.5	619 1.5 LEG	2.0 (E0 2.5	67K 2.5 LEQ 3.0	3.0 LEG 3.5	678 3.5 LEG 4.1	6TR 4.0 LE0 4.5	67k 4.5 LE0 5.0	5.0		MISSING	S
PC UH	0.00	000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	37	44.44 PRENT OF REPORTS	74 t S
0	DISTRICT 8		VISUAL KATING					HEAN	8.	SIGHA	. 36 K	KEPORT	17.	SAMPLES	13
	LEO 0.0	61R 0.0 LE0	GTR LEG 1.0	11.6 LF0 1.5	67R 1.5 LEQ 2.0	61 F 2 • 0 1 E 0 2 • 5	678 2.5 1.60 3.0	61 P 3.0 LEQ 3.5	3.5 LEG 4.1	GTR LEG 4.5	6TR 4.5 LEO 5.0	5.0 5.0		MISSING VALUES	S
PC MT	15.38	0.00 15.38	84.62	9.00	100.00	160.00	0.00	0.00	0.00	100.00	100.00	0.30	3	23.53 PRONT OF REPORTS	* 53 KT S

						Table XXV.	1978	Totals (All	(All Properties)	s)			
1978	TOTALS	01277114	LLATH INI		FULLING OF	4 94J		NAG	138. S	SIGHA	13.1	PLFOFT 65	651. SAMPLES 610
	115.	678 115. 120.	120. LF0 125.	133.	130. 130.	135.	67P 140	679 145.	678 153. LEG 155.	618 155. LEO 160.	160. 160. 165.	612 165.	MISSING
PC NT		20.5	13.77	16.07 25.84	15.25 45.38	16.07 61.15	12.79	8.03 61.97	7.05	5.38 94.10	4.10	11 1.80 1.00.00	41 6.30 PRCNT OF REPORTS
1978	TOTALS	DISTILL	1114 132	PECCVE	Fro, ors	u	ā,	14	201. SI	SIGHA	10.0 20.0	REPORT 651.	. SAMFLES 645
	185.	185. 185.	110. 170. 135.	677 195	200. LEG	675 205 LFD	618 219. LEG 215.	618 215. LEO	67.8 220. 150 225.	618 225. LEG 230.	678 230. LEG 235.	6Th 235.	MISSING
PONT	111117.21	75 11.63 26.84	7.75	10.77	10.54 57.83	13.80	7.13	86.38	3.72	3.72	1.55 95.97	26 4.03 136.00	PKCNT OF REPORTS
1974	TOTALS	LISTILLAT	LATM 20%	Z PECOVERE	. Et., 01.6	u.	ř	JE PN	228. SI	SIGNA	50.05	KFF UK1 651.	I. SAMPLES 638
	LE0 175.	677 175. 150 185.	1989 1989	67. 195. 180 205.	678 205. (E) 215.	67.8 215. 1.0 2255.	61h 225. LEO 235.	673 235. LEO 245.	618 245 LEO 255	618 255. LEO 265.	61.8 265. LEO 275.	6Tr. 275.	MISSING
PO P		116	4.05 5.02	7.55 13.01	15.36	19.26	130 20.36 58.03	3.48 81.50	7.93 89.50	4.23	3.92 3.92 97.65	2.35	2.00 PHONT OF REPURTS
1978	1978 TOTALS	FISTILLA	LLATH SFZ	X RECOVEFFE.	FFT, DEG	u	•	AEAN	295. SI	SIGHA	27.4 F	REFORT 651	1. SAMPLES 631
	160	675 220. 150 235.	61P 235. LEO 250.	67° 250. LEO 265.	678 265. LEQ 280.	6. R 280. LEO 295.	61R 295. LEO 310.	325.	618 325. LEO 340.	678 340. LEG 355.	618 355. LED 370.	370.	MISSING
PP ED PC UT	000	96.	3.49	10.94	119 16.86 33.23	111 17.59 50.87	126 19.97 70.84	15.85 56.69	6.24 94.93	3.49	10.00	100.00	26 3.07 PECNT OF REPORTS

SARPLES 640	MISSING VALUES	11 1.69 NT OF REPORIS	SAMPLES 647	VAL UES	4 •61 PHCNT OF REPORTS	SAMPLES 231	MISSING	420 64.52 PACNT OF REPORTS	SAMPLES 628	HISSING	23 3.53 NT OF REPORTS
651.		PRCNT	651.			651.	0		651.	•	PRCNT
REFORT	67K 473.	00.004	REPORT GTR	33	1000	PEPORT	9. 3. S.	7.36	KEPGET	61k 57.	1.0.00
33.9	61K 455. LEO 470.	100.001		515. LEO 530.	160.00	7.09	61R 96.0 1E0	22.51 92.64	1.86	618 56.0 660 57.0	12.42
SIGHA	618 6449 655	99.53	SIGNA	503. LEG 515.	4.17	SIGNA	67.8 94.0 LEO 96.0	7,36	SIGMA	618 55.0 LEG 56.0	19.59 87.56
431.	678 425 LeG 440	136 21.25 93.12	459. S	599.	112 17.31 55.83	90.1 S	42.0 12.0 94.0	5.13 62.77	53 69 S	678 184.0 189.0	17.52 67.99
HEAN	6TP 410. LEQ 425.	143 22.34 71.38	1EAN GTR	470. LED 485.	141 21.79 78.52	4E AN	90.0 LEG 92.0	8.66 57.58	JEAN	678 53.3 LEG 54.0	20° 125 20° 05 50° 40
	676 395. LEQ 410.	14.26	٠ 2	455. LEQ 470.	140 21.54 56.72	Ŧ	67.R 000.C 10.0	5.63 46.92	7	61R 52.0 LEG 53.0	16.24 30.41
	388 388 1880 305	19.31 75.31	<u>.</u>	446. 100 455.	12.67 35.09		0 . 8 . 0 1 . 0 0 . 8 . 0	10.39		61 F 51.0 1 E O 52.0	7.96 14.17
, ED, 356	678 365.	8.13 25.00	F 5 27	, 425. 449.	5.72	4 00 F	84.0 1.60 0.60	9.55 32.90		6TK 50.0 51.0	3.50
SOZ RECOVEFED.	353. LF0 365.	5.63	4	419. 425.	5. 92 15.60	. v 63.	6716 42.0 1.0 84.0	5. 16 23.30	A > 1	49.0 150 50.0	. 96 2.71
z	67.9 885. L=0 850.	6.84 11.25	CATN SNC	395. LEQ +10.	6.34 10.65	T RECOVE	618 619 82.0	7.74	9	7.64 7.669	1.75
OISTILLAT	67 P 320. 1.50	2.55 4.38	CISTILLATIN GTR GT	300. LF0. 395.	2.63	FRCENT	0.0%	3.03	GPAVITY,	61 K	196.
TOTALS	320.	11.72	TOTALS	388.	1.70	1978 TOTALS	78.3	60.440	TOTALS	47.0	322
1978		7 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1978 TOTAL		FCMT FCMT	1978		FP ES PONT ACUM	1978		PERSON PERSON

SAHPLES 609	MISSING	6.45 6.45	SAMPLES 597 MISSING	VALUES	8.29 OF REPORTS	SAMPLES 287	MISSING	364 55-91 UF REPORTS	SAMPLES 629	HISSING	3.38 3.38
651.		PRCNI	51. s		PACNT	51. S		PRCNT	51.		- N C G G
KE FOFT	61R 5•0	100.00	9	.500	100.00	REFORT 6	. 0010	100.00	REFORT 6	π ω •	0000
.64	6:1K	100.00		. 450 LEO . 500	100.00	0 6029 RE	.0009 LEQ .0010	33 11.50 100.00	.24 1.6	67k 2.9 LEG 3.0	4.29
SIGHA	678 4.0 LE0 4.5	100.00	SICHA GTR	. 456 . 456	100.00	SIGHA	.0000 LEQ .0009	2.75 2.75 88.50	SIGHA	61R 2.9	10.33
9.	678 3.5 4.9	00.00	042 6TR	. 35u Leg . 400	100.00	1S 5000	. 1308	13 4.53 85.71	2.6 SI	678 2.7 LEG 2.8	11.76
HEAN	6.8 3.0 3.5	99.84	Z	.350 LEG .350	100.00	FAN .	.0006 LEO	4.13 81.10	4E AN	678 2.6 LEG 2.7	1138
r	618 2.5 LEQ 3.0	39.34	45 67.8	.300	100.00	¥.	67k 6905 LEG	23 8.01 77.00	#	67K 2.5 LE0 2.6	17.01
	676 2.0 1.50 2.5	1. 2. 1. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	: e	.280	3.000	7	40000	10.031		2.5	10.49
	678 1.5 1.0 2.0	11.811	FFF CENT GTR	618 -155 LEQ	2.35 99.33	WELGHT Procent	.0003 LEO	10.80 56.10	C of	618 6.5 1.60 2.4	11.45
F6/103N	67 ii 1.0 1.5	6.24 45.73		.169 LEG .150	5. 33 6. 98 9. 98		.0002 LEG	16.63	Suge, te	67. 2.2 1.E.6 2.3	7.00
ENT GUM,	6:1	9.00	Streum,	. 150 . 100	36 14.41 91.73	REPORETAR SULF'IS	. 0333 L. 0	13. 46 31. 36	VA FO. F. F	6.8	30 6.20
EXISTENT	9.6 0.50 6.50	34.32	TOTAL	0.000	461 77.22 77.39	RED CAP	0.3000 LEQ .0001	50 17.42 17.42	2	678 2.0 LEO 2.1	3.66
1978 TOTALS	6.0	276 45.32 45.32	TOTALS	0.000 0.000	11.	1978 TOTALS	0.0000		TOTALS	2.5	111
1976		FRES ACUM	1978		FRED	1978		PCNT	1978		FE ED

51. SAMPLES 597	HISSING VALUES	54 8.29 PRCNT OF REPORTS	SAMPLES 614	MISSING	37 5.68 PRGNT OF REPORTS	SAMPLES 604	HISSING VALUES	47 7.22 PRCNT OF REPORTS	SAMPLES 572	HISSING VALUES	79 12.14 PRCNT OF REPORTS
REFORT 65	61R 43.9	100.00	REPORT 651	61K 25.0	0.00	REPORT 651.	618 5.0	0.00	REPORT 651.	6TK 15.10	0.00
	618 43.8 LEQ 43.9	.34	3.25 RE	6TR 22.5 LEQ 25.0	100.00	.42 FE	67R 4.5 LEQ 5.0	100.00	.22 RE	GTR 14.95 LEQ 15.10	100.00
SIGHA	618 43.7 LEO 43.6	31 5.19 99.66	SIGMA	6TR 20.0 LE0 22.5	1047	SIGMA	61R 4.0 LEG 4.5	100.001	SIGHA	6TR 14.86 LEG 14.95	100.00
43.5	67R 43.6 LEG 43.7	156 26.13 94.47	11.4 S.	67R 17.5 LEO 24.0	2.12 98.53	ن ن	618 3.5 4.9	100.00	4.36 S.	GTR 14.65 LEQ 14.80	7.69
HEAN	618 43.5 LE0 43.6	32.50 63.34	HEAN	6TR 15.0 LE0 17.5	10.42	HEAN	678 3.0 LEQ 3.5	.33 100.00	HEAN 1	6TR 14.50 LEQ 14.65	24.30 92.31
	618 43.4 LEQ 43.5	116 19.43 35.85	Ŧ	61R 12.5 LEQ 15.0	117 19.06 35.99	Ŧ	61R 2.5 LEQ 3.0	.33	Ť	6TR 14.35 LE0 14.50	146 25.52 68.01
MJ/KG	6. k 43.3 1 0 43.4	10.72 15.42	TN	61K 10.0 LF0 12.5	28.18 66.94		8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	96.66		67.6 14.20 LF0 14.35	113 19.76 42.46
(CALCE)	61.P 43.2 LEQ 43.3	4.60 5.70	VOLUPE FENCENT	6TR 7.5 LF0 10.0	30.78	PERCENT	61R 1.5 LEQ 2.0	3.54	(CALCO)	578 14.05 LEQ 14.20	12.06 22.73
COMBUST.00 (C	43.2	 		67F 5.0 LEO 7.5	7.17 7.98	, VOLUME	67.F 1.0 1.5	111.09		677 13.90 LEO 14.05	37 6.47 10.66
UF COMBL	670 43.0 LEQ 43.1	00000	IC CONTENT,	61R 2.5 LED 5.0	. 61	CONTENT,	678 LE0 1.9	328 54.30 53.61	HYDROGEN	13.75 LEQ 13.90	3.67
HEAT	618 42.9	000	AROMAT IC	678 0.0 150 2.5	•••	OLEFIN	67 K	26.31 20.30	PERCNI	GTR 13.60 LEO 13.75	. 55 2 2 2 2 3
1974 TOTALS	LEG 42.9	000	1978 TCTALS	160	00000	1978 TOTALS	LEO.	955	1978 TOTALS	13.60	0000
1974		PONT PCUM	1978		FP EQ PCNT	1978		PONT	1978		PC ST

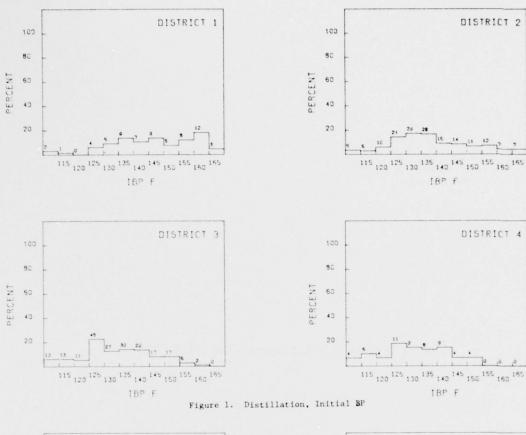
SAMPLES 569	HISSING VALUES	12.60 REPORTS	TES 642	MISSING	1+36	SAMPLES 625	MISSING	3.99 KEPORTS	LES 599	HISSING VALUES	7.99 RE PORTS
.75		PRCNT OF	651. SAMPLES		PRCNT OF	651. SARP		PRCNT OF	51. SAMPLES		PRCNT OF
REFORT &	£5.	130.00	REFORT 65	67E 160.	100.00	REPORT 65	1.00	100.00	REPORT 65	67K .020	100.00
3.30	678 36.0 LE0 38.0	10.00	7.2 RE	6TR 97. LEQ 100.	13.71 100.00	.24 PR	6TR • 30 • 100	1.444	. 0028 KE	616 • 118 LEQ • 020	100.00
SIGHA	618 34.0 16.0 36.0	2.46 99.30	SIGHA	6124 144 150 97	107 16.67 86.29	SIGHA	618 - 8C - 99	3.84 98.56	SIGHA	67R • 016 LEQ • 618	100.00
27.5	32.0 LEO 34.0	3.34 96.84	90.	67R 91. 34.	11.5	.37	67 R	5.92	. 006 S	618 • 014 LFO • 015	.33
MEAN	614 36.0 LEO 32.0	93 16.34 93.50	4E AN	67.8 680. 91.	31 12.46 52.02	4E A.	. 69 LEO	4.064 88.30	1c AN	6TR • 012 LEG	1.50
	618 28.0 1.50 30.0	15.82	7	6.85 88	20 12.46 39.56	•	618	7.84		61K .910 LLO	7.01 98.16
	25.0 1.0 25.3	124 21.79 61.34	0	675 170 170 170	7.17	9	61.	50.00		678 • 008 L90 • 010	11.35 95.16
	67 K 24.0 LE 0 26.0	124 21.79 39.54	Y YOU'ET	67k 79. LF0	8.41 19.94	TE, FGZLTTER	61 R . 3 U LE 0	15.20	. <b>A</b> R.	960.	14.20
	67 F 22.6 156 24.0	75 13.16 17.75	XEDAL NOT	674 76. LFG 70.	5.92	ONTARINAT	67. .2. LEG	14.8c 53.12	FS KOHZGLAR	676 • 064 LEG • 000	28.27
FOINT	67.K 24.0 LEO 22.0	4.22	SEPACATION	67.8 73. LF0	4.21	FAFTICULATE CONT	61. 1.00.	19.20	NUKBER,	2005. 1003.	20.03
PROKE	13.0 18.0 18.0 20.0	33.2	WATER	67 R 70.	1.40	PAFTIC	9.00	17.44	4CID 4	67K 150 150	15.86
TOTALS	13.0	0000	TCTALS	70.	00000	1978 TOTALS	0.00	1.000	TOTALS	LEG 0.000	SW E
1978		PRED PCUM ACUM	1978		PPED PCNT ACUM	1978		FPED FCNT ACUM	1978		PONT ACUM

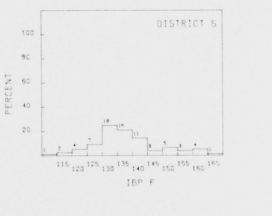
627	9 11 8	24 3.69 0RTS	115	2	536 62.33 PORTS	394	9 X S	257 48 .TS
SAMPLES	FISSING VALUES	24 3.69 PRUNT OF REPORTS	SAMPLES 115	VALUES	536 62•33 PAGNT OF REPORTS	SAMPLES 394	HISSING VALUES	257 39.48 PRONT OF REPORTS
REPORT 651.	678 12.0	11 1.75 10C.00	4E PORT 651.	10.0 10.0	100.00	KEPORT 651.	61k 5.0	100.00
2.1	678 11.0 LEO 12.0	1.12	1.5	9.0 LEO 10.0	.87 100.80	₩.	618 4.5 LEO 5.0	100.00
SIGHA	678 10.0 10.0 11.0	1.28	SIGHA	9.00	0.00 99.13	SIGMA	617 6.0 7.0 6.0	100.00
5.1	67.R 9.0 10.0	1.12	1.1 SI	7 7 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	99.13	1.0 SI	61R 3.5 LEG	100.00
HEAN	61R	94.30	1EAN	7. 7. 7.	0.00	1E AN	67R 3.0 LE0 3.5	100.00
1	67.8 7.0 1.60 8.6	2000	<del>,</del>	6.0 6.0	98.26	46	678 2.5 LEQ 3.0	.25 100.00 1
110	6.00	7.66		61E 61E 500	1.74 98.26		6.5 1.0 2.5 5.5	. 25 99.75
ורסמי, יו	5.6 5.6 6.0	11. 48 -2. 46		0.5. 0.5. 0.4.	2.61 96.52		618 11.5 2.6	5.08
יושני ז פררוסמי,	631 LE9 5.0	186 28.71 70.97	0F HG	3.0	1.74		678 1.1 1.5 1.5	2.54
FILIDATION TE	2 6 2 4	27.59 42.26	2	200.00	21 15.25 92.17	VISUAL FATING	6. P	345
FILL	5 2 5 E	14. 64 14. 67	d	0.0 1.0 1.0	35 73.91 73.91	VISUAL	4.0 0.0 8.	3.55
1972 TOTALS	200	444	1978 TGTALS	0.0	000000000000000000000000000000000000000	1978 TOTALS	6.0	00.00
1972		PO P	1978		PC PT PC PT	1978		FP ED FC UT

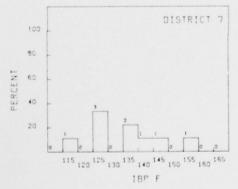
Of the missing values reported here in Fuel Thermal Stability, (i.e., Delta P and Visual Rating), 116 of those are really missing values. The balance was actually reported as 0.0 NOTE:

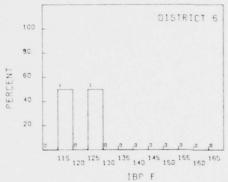
APPENDIX B - Histograms for 1978 Data

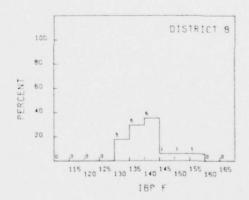
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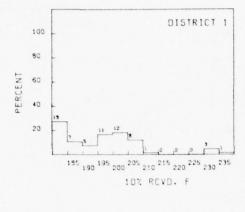


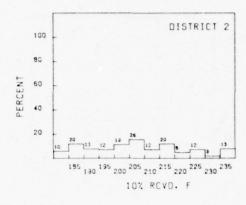


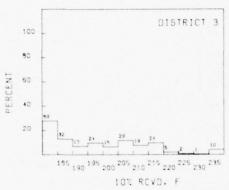












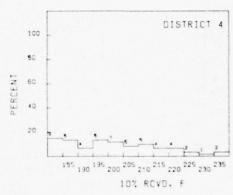
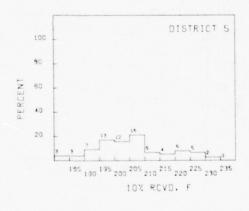
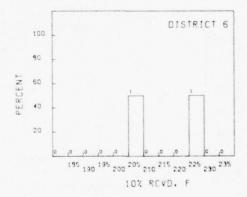
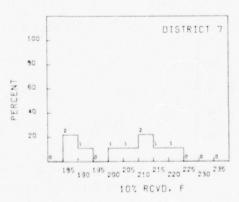
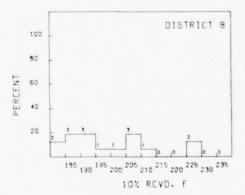


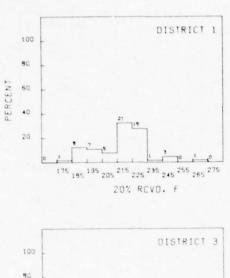
Figure 2. Distillation, 10% Recovered

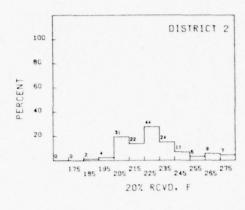


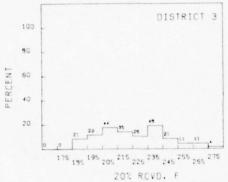












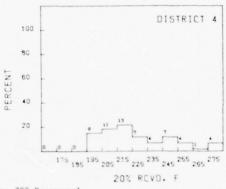
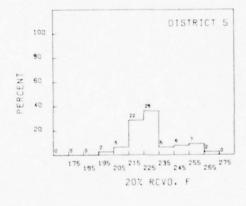
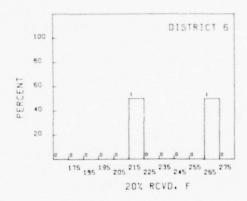
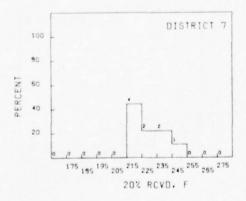
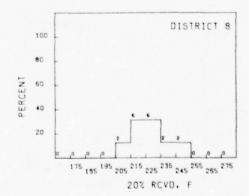


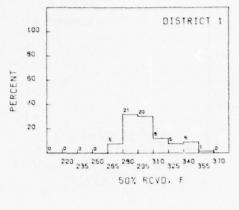
Figure 3. Distillation, 20% Recovered

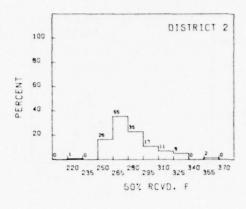


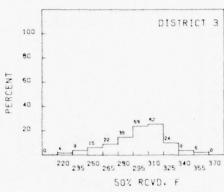












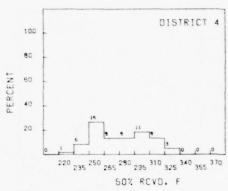
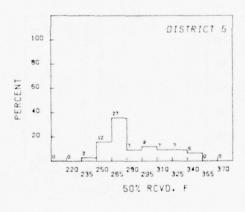
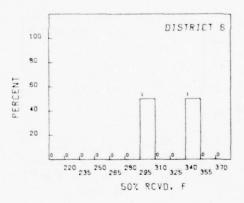
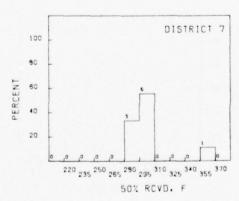
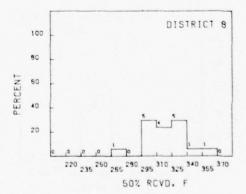


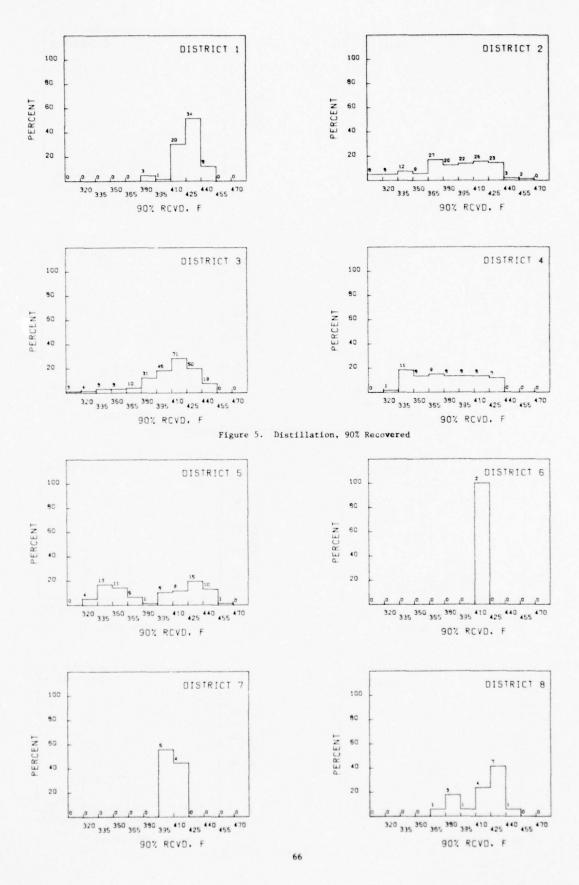
Figure 4. Distillation, 50% Recovered

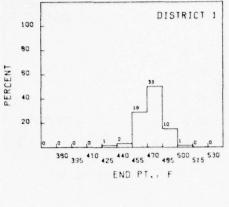


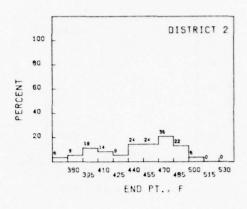


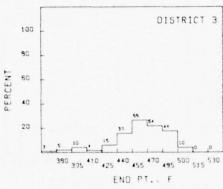












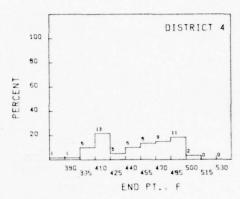
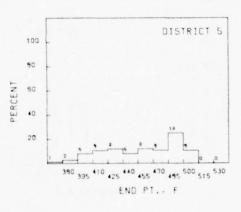
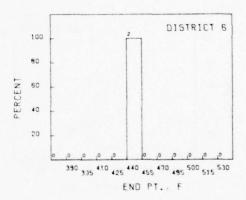
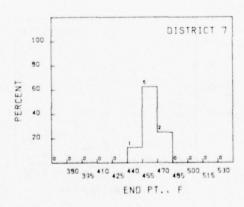
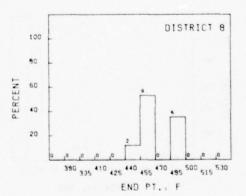


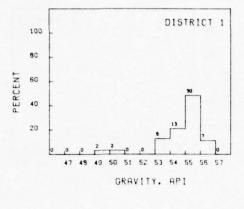
Figure 6. Distillation, End Point

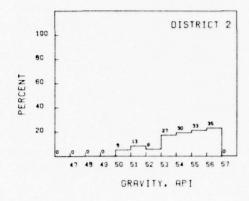


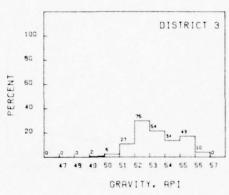












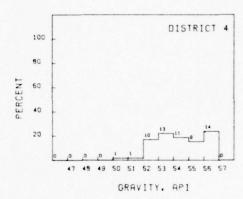
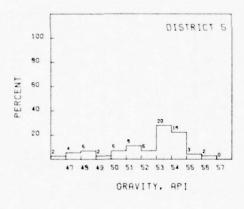
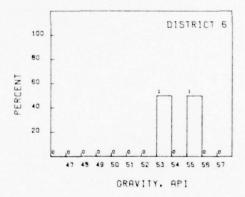
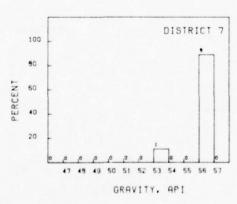
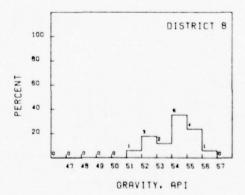


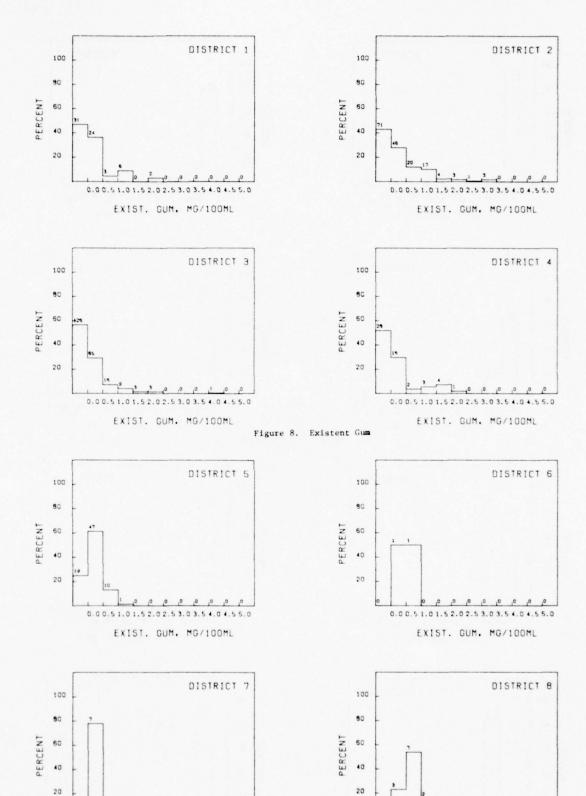
Figure 7. Gravity, DEG API







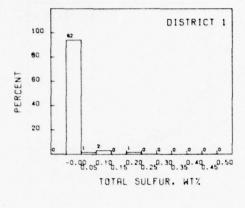


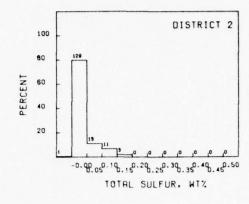


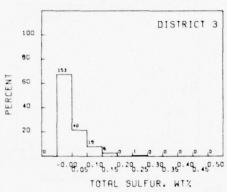
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EXIST. DUM. MG/100ML







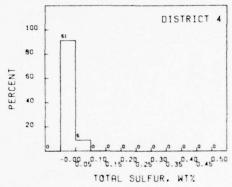
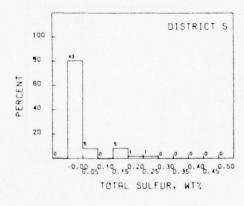
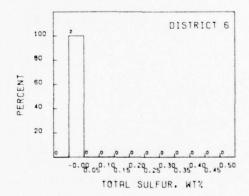
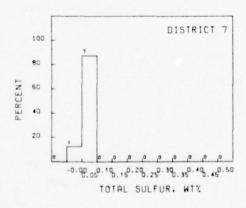
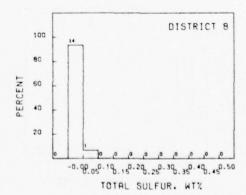


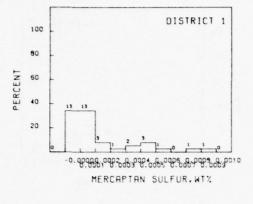
Figure 9. Total Sulfur

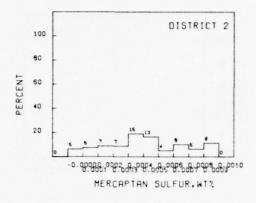


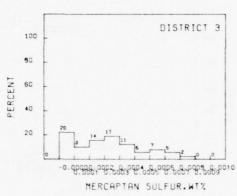












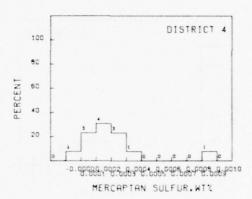
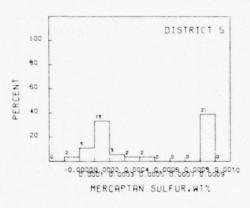
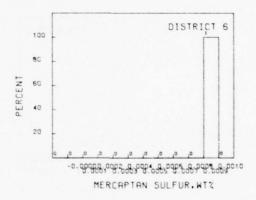
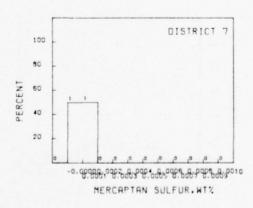
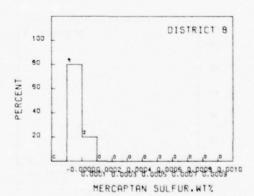


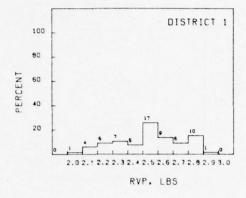
Figure 10. Mercaptan Sulfur

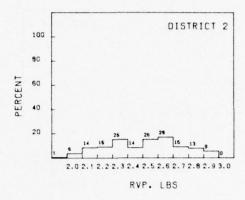


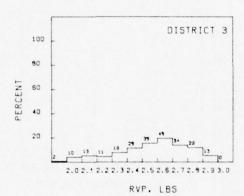












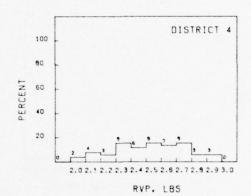
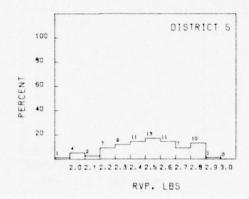
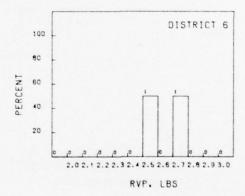
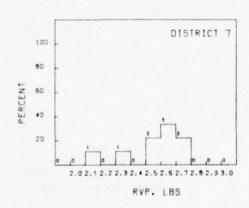
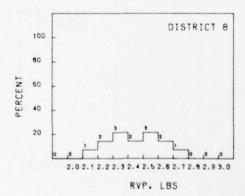


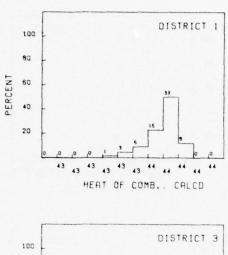
Figure 11. Reid Vapor Pressure

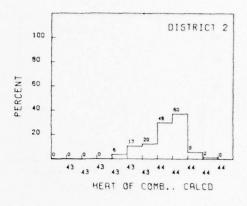


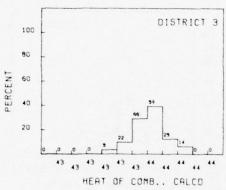












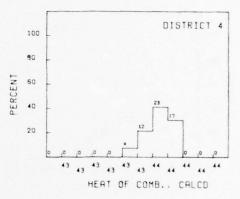
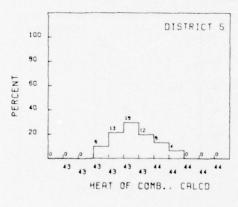
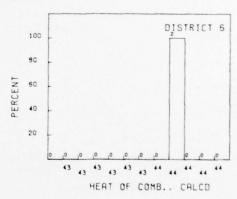
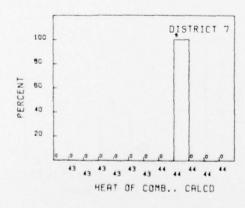
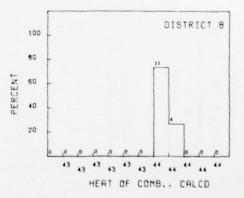


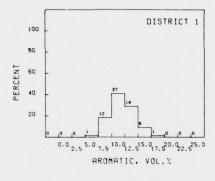
Figure 12. Heat of Combustion

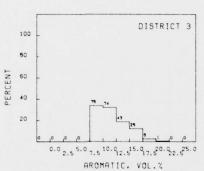


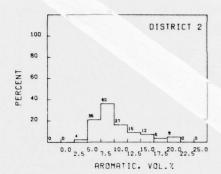












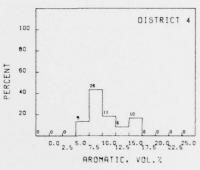
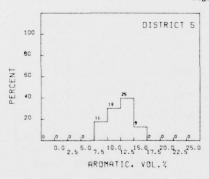
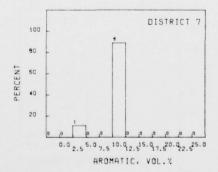
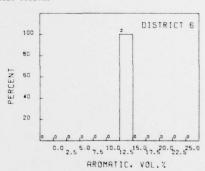
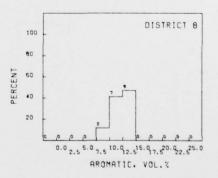


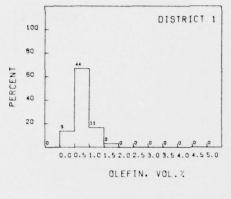
Figure 13. Aromatic Content

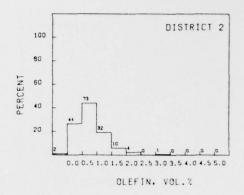


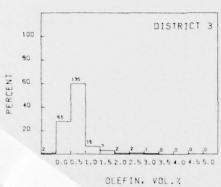


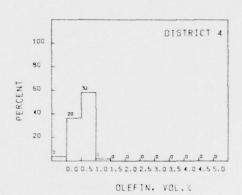




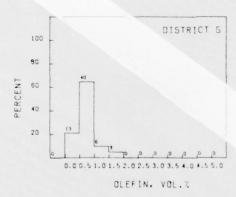


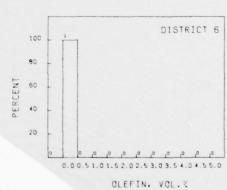


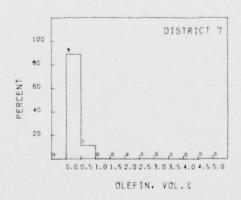


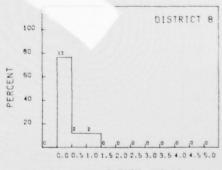


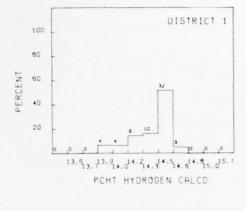


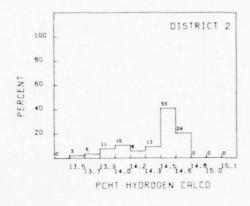


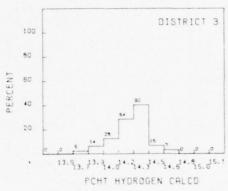












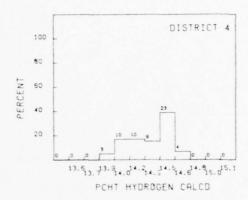
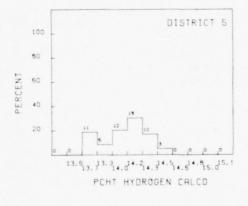
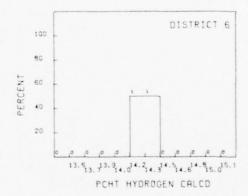
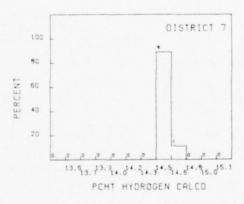
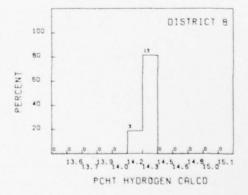


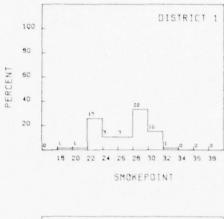
Figure 15. Percent Hydrogen

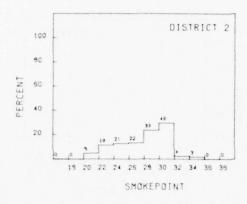


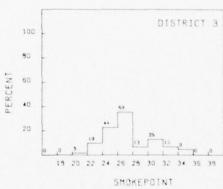


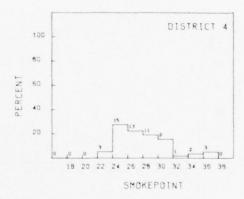




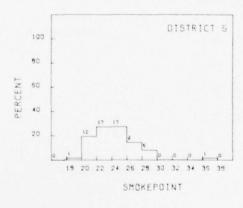


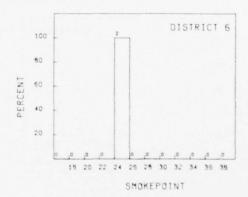


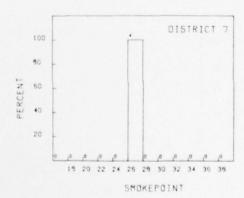


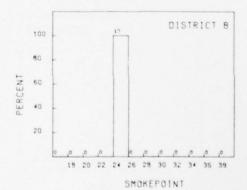


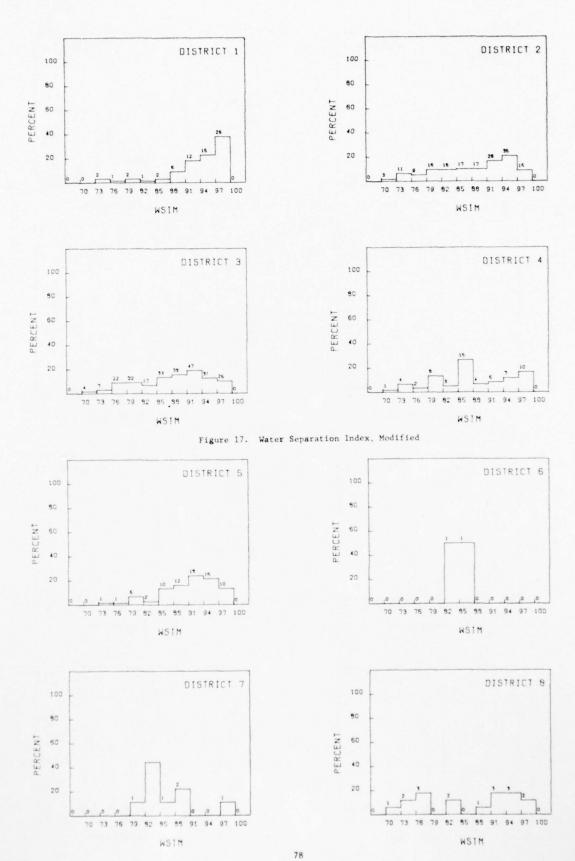


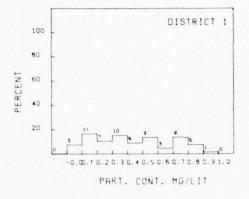


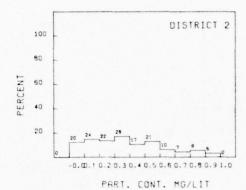


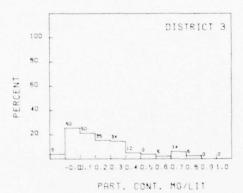












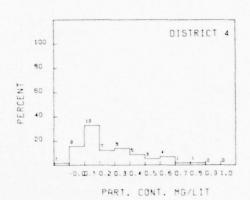
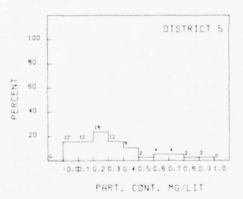
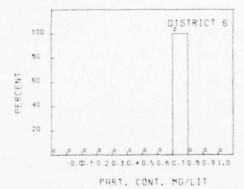
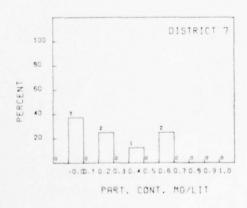
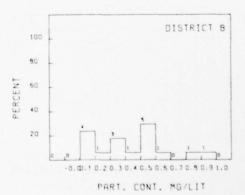


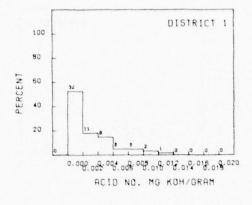
Figure 18. Particulate Contaminate

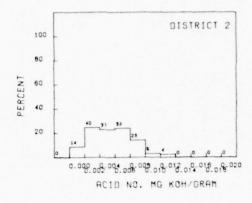


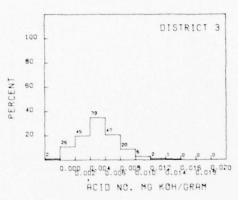












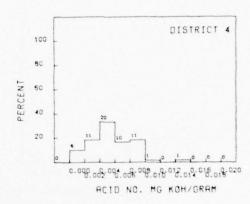
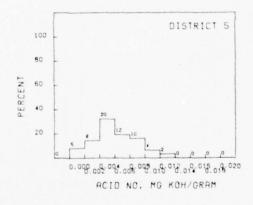
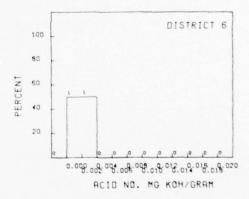
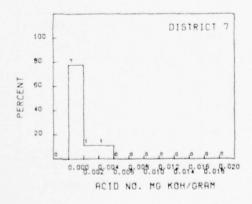
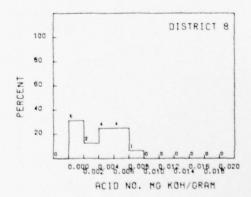


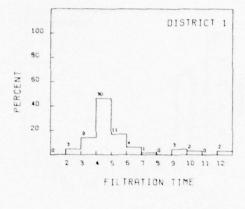
Figure 19. Acid Number

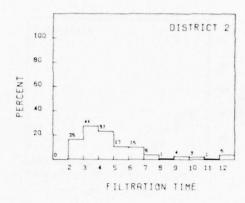


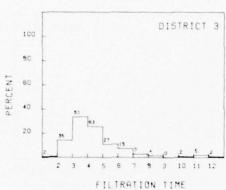












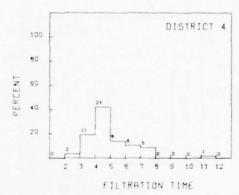
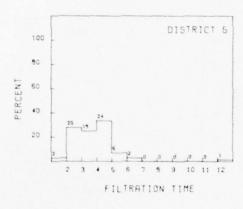
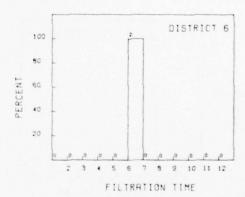
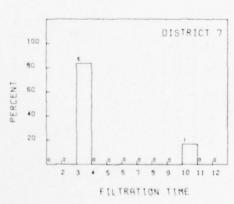
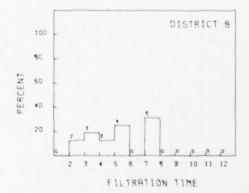


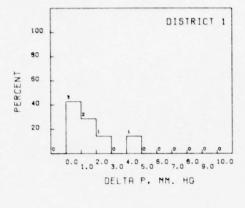
Figure 20. Filtration Time

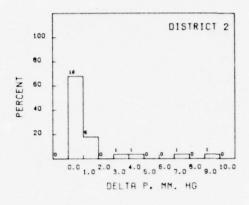


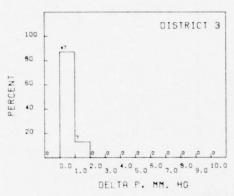












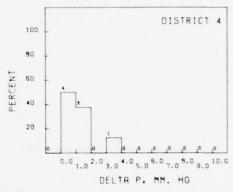
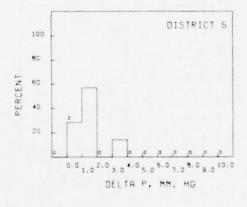
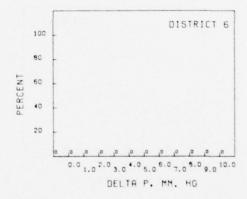
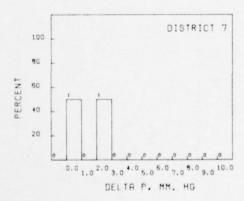
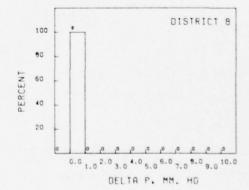


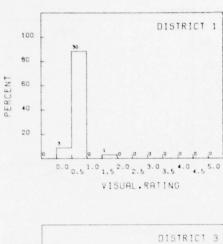
Figure 21. Thermal Stability, AP

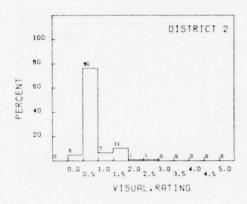


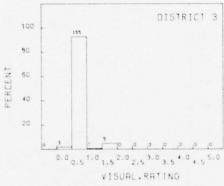












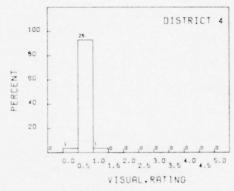
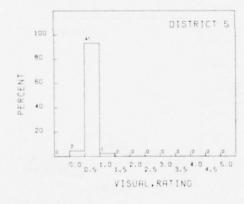
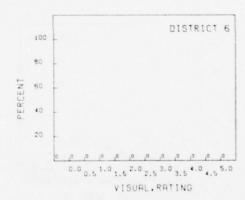
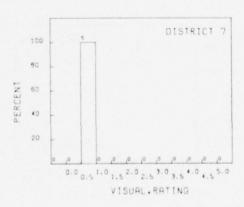


Figure 22. Thermal Stability, Tube Color Code







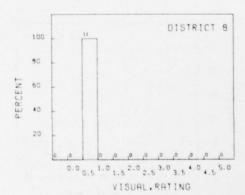
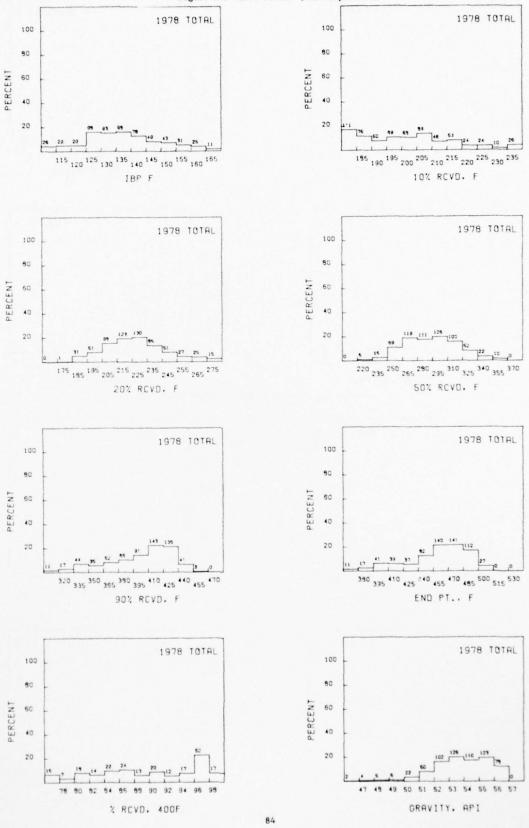
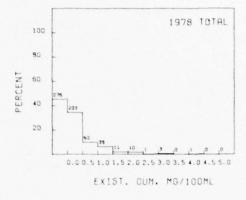
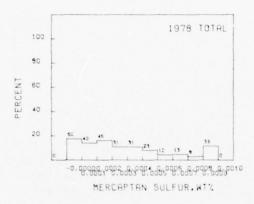
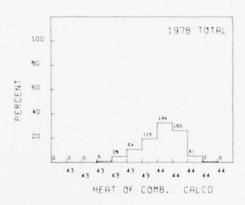


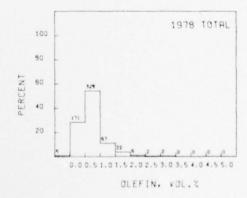
Figure 23. 1978 Totals (All Properties)

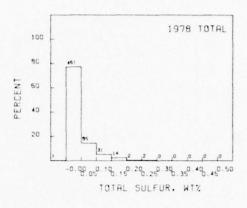


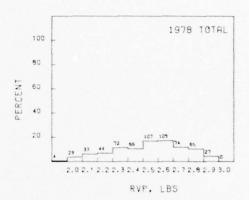


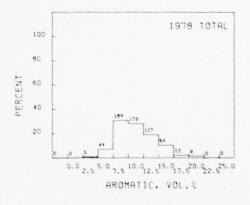


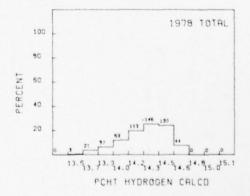


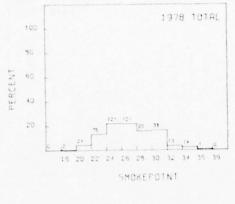


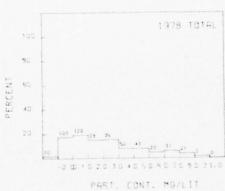


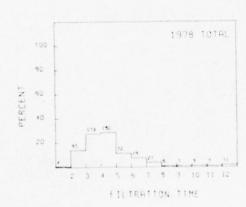


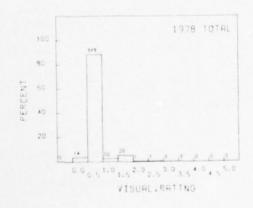


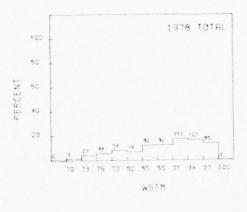


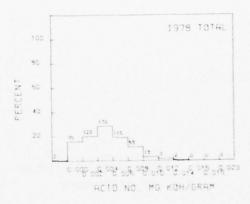


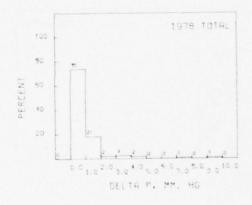


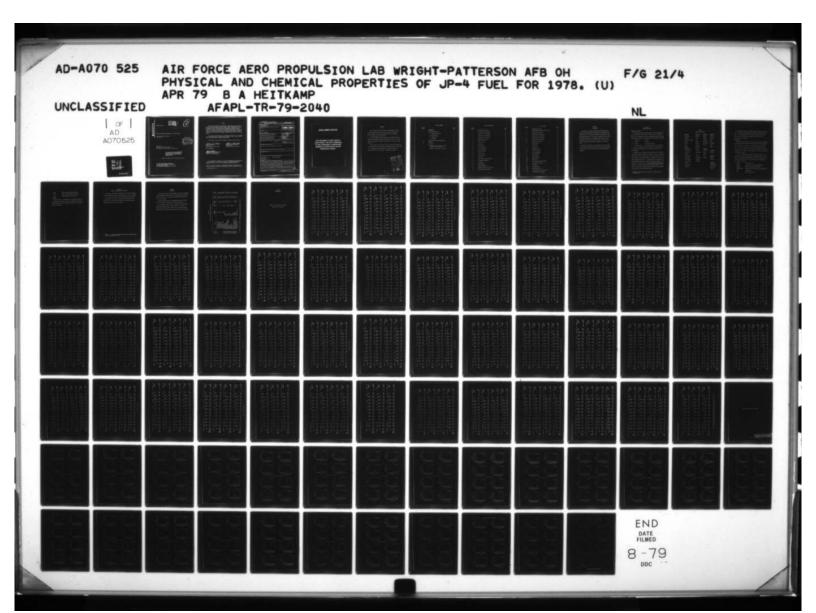














AFAPL-TR-79-2040



PHYSICAL AND CHEMICAL PROPERTIES OF JP-4 FUEL FOR 1978

Fuels and Lubrication Division Fuels Branch



April 1979
TECHNICAL REPORT AFAPL-TR-79-2040
Final Report for Period January - December 1978

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This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

Blaine A. Heitkamp

Fuels Branch

Fuels and Lubrication Division

Arthur V. Churchill, Chief

Fuels Branch

Fuels and Lubrication Division

FOR THE COMMANDER

Blackwell C. Dunnam, Chief

Fuels and Lubrication Division

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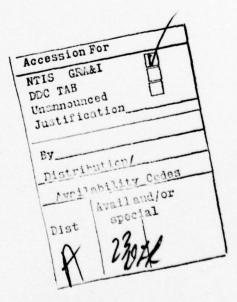
## FOREWORD

This JP-4 fuels report was prepared by the Fuels Branch of the Air Force Aero Propulsion Laboratory, Air Force Systems Command, Wright-Patterson AFB, OH. The work was performed under work unit 304805FL.

Mr. B. A. Heitkamp was project engineer.

This report presents a computer generated and assembled statistical summary of the chemical and physical properties of JP-4 Jet Fuel. These fuels were procured by the Defense Fuel Supply Center during the calendar year 1978.

The author wishes to extend his gratitude to Miss Cheryl Florence and Mr. Kermit Redmon for their assistance in assembling the data. Appreciation is also extended to Miss Elaine Baldwin. Miss Charlene Diamond, and Mrs. Linda Phillips for their support in assembling this report.



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#### SECTION I

## INTRODUCTION

This report is a statistical summary of assorted properties of JP-4 Aviation fuel delivered to the Department of Defense during the calender year 1978. These various properties are recorded on a fuel batch inspection report, a copy of which is submitted to the Air Force Aero Propulsion Laboratory. Approximately twenty percent of these inspection reports are the basis for this report. Similar fuel reports were presented in the years 1963 through 1967, 1970, 1972, & 1975.

This report will provide a quick reference on JP-4 fuel quality.

One will be able to identify numerous ranges of properties along with their incidence, and also identify differences between geographical districts.

# SECTION II ORGANIZATION OF DATA

### GEOGRAPHICAL DISTRICTS

Fuel inspection reports have been separated into eight geographical districts according to point of origin. These districts are listed in Table I and are essentially the same as those designated by the Petroleum Administration for Defense. These districts may be summarized as follows:

- 1. East Coast
- 5. Pacific
- 2. Midwest
- 6. Far East
- 3. South

TESTS SELECTED

- 7. Europe and Near East
- 4. Rocky Mountain
- 8. South America, West Indies, and Canada

It should be emphasized that this classification is based on point of origin (refinery location) and not destination or point of use.

Twenty-three of the inspection tests required by the JP-4 specification, MIL-T-5624K, were selected for analysis of results. These tests differ slightly from the tests analyzed in the previous report. In this year's report, the fuel thermal stability is measured by the JFTOT Fuel Coker (ASTM Method D 3241) only. A new parameter has been added as well. The percentage of Hydrogen is calculated from submitted properties. The calculation for this is found in the 1976 Annual Book of ASTM Standards, Volume 25<sup>1</sup>. Also, smoke volatility index has been eliminated as a parameter. Finally, the units for net heat of combustion have been changed from BTU's/1b to mega joules/kilogram (MJ/kg).

<sup>1</sup> ASTM D3343, Standard Method for Estimation of Hydrogen Content of Aviation Fuels.

TABLE I
GEOGRAPHICAL DISTRICTS

DISTRICT 1	DISTRICT 2	DISTRICT 3	DISTRICT 5
Connecticut	Illinois	Alabama	Arizona
Delaware	Indiana	Arkansas	California
District of Columbia	Iowa	Louisiana	Nevada
Florida	Kan <b>s</b> as	Mississippi	Oregon
Georgia	Kentucky	New Mexico	Washington
Maine	Michigan	Texas	Alaska
Maryland	Minnesota		Hawaii
Massachusetts	Missouri	DISTRICT 4	
New Hampshire	Nebraska	Colorado	DISTRICT 6
New Jersey	North Dakota	Idaho	Far East
New York	Ohio	Montana	
North Carolina	Oklahoma	Utah	DISTRICT 7
Pennsylvania	South Dakota	Wyoming	Europe
Rhode Island	Tennessee		Near East
South Carolina	Wisconsin		
Vermont			DISTRICT 8
West Virginia			South America
Virginia			West Indies
			Canada

The ASTM method number and the ASTM precision statements refer to those found in the previously mentioned book of standards, including Volumes 23 and 24. The specification test limits refer to publication MIL-T-5624K dated 1 April 1976 and are much the same as the previous edition of MIL-T-5624J of 30 October 1973.

#### TABULATED DATA

Many reports submitted contained values which were invalid or ambiguous, and therefore the value was waived. Mercaptan Sulfur was excluded in about 50% of the reports. This is due to the fact that there is an alternate test, called the Doctor Test, which is also acceptable under MIL-T-5624K. Recovery at 400°F, though still reported by many fuel suppliers and included in Table XXV, is no longer a required parameter and is therefore eliminated from the District Report.

Tables III through XXIV of Appendix A are computer printouts of the distribution, mean, and standard deviation for each fuel property. These tables are each arranged by geographical district while Table XXV gives the 1978 overall population totals for each fuel property. Nomenclature for these tables is as follows:

SIGMA Standard deviation

REPORTS Total number of fuel reports represented.

SAMPLES Number of reports with valid value.

MISSING VALUES Number of reports with missing or invalid values.

GTR Greater than.

LEQ Less than or equal to.

FREQ Number of values within limits shown.

PCNT Percent of values within limits shown.

ACUM Cumulative percent to upper limit.

#### HISTOGRAMS

Figures 1 through 24 of Appendix B are computer-generated plots of the distribution data given in Tables III through XXV of Appendix A. These histograms represent a convenient visualization of the property frequency distributions.

# SECTION III METHOD OF DATA REDUCTION AND ANALYSIS

The method of data reduction and analysis used in this year's report is basically the same as used in the previous report by Mr. L. C. Angello<sup>2</sup>.

Fuel reports from one complete week were separated from the monthly total and used for this report. This procedure was followed for each month in 1978. In this way manpower output is reduced without significantly affecting the accuracy of the results.

<sup>2</sup> Angello, L. C., Physical and Chemical Properties of JP-4 Fuel for 1975, Wright-Patterson AFB, OH 1976.

### SECTION IV

As previously stated, the data presented in this report are based on a random sampling of monthly reports. Since these reports are provided without a specification of fuel quantity represented, equal weight is carried by each sample.

As could be expected, some of the reported values will be beyond specification limits. When this occurs, the value is waived.

As in the previous report (1975), no systematic effort was made to identify chronological trends. However, Table II will identify the differences in mean values between the previous report and this year's report, along with identifying the testing method and the units reported.

TABLE II
MIL-T-5624K SPECIFICATION LIMITS FOR JP-4

D 86 Distillation, IBP OF	METHOD	TEST	UNITS REPORTED	SPEC LIMITS MIN. MAX	IMITS MAX.	1978 MEAN	1975 MEAN
10.2   10.2	98 U	Distillation IRD				138	17.1
10% Recovered OF 203 20% Recovered OF 293 228 50% Recovered OF 374 295 90% Recovered 400 OF 518 459  % Recovered, 400 OF 90.1  1298 API Gravity	00 0	DISCILLACION, IDI	4 6			170	141
20% Recovered         OF         —         293         228           50% Recovered         OF         —         374         295           90% Recovered         OF         —         473         401           End Point         CAPI         —         473         401           1298         API Gravity         Z         —         90.1           381         Existent Gum         mg/100 ml         —         7.0         .8           1552         Total Sulfur         vt Z         —         .4         .042           1552         Total Sulfur         vt Z         —         .4         .042           1323         Mercaptan Sulfur         vt Z         —         .4         .042           1323         Mer Heat of Combustion         wt Z         —         .001         .005           1405         Net Heat of Combustion         MJ/Kg         —         .2.0         3.0         2.6           1405         Aromatics         vol Z         —         .43.5           1319         Aromatics         vol Z         —         .5.0         .8           1322         Smoke Point         mm         wt. Z         —		10% Recovered	5	1	1	201	211
50% Recovered         °F          374         295           90% Recovered         °F          473         401           End Point         °F          473         401           1298 API Gravity         °API          518         459           381 Existent Gum         °API         45.0         57.0         53.9           381 Existent Gum         wt %          -         40.1           1552 Total Sulfur         wt %          .4         .042           1323 Mercaptan Sulfur         wt %          .4         .042           1323 Mercaptan Sulfur         wt %          .4         .042           1405 Net Heat of Combustion         MJ/Kg          .001         .005           1405 Net Heat of Combustion         Vol %          .001         .005           1319 Aromatics         Vol %          .5.0         .8           1322 Smoke Point         mm         Vol %          .5.0         .8           1322 Smoke Point         mm         Wt. %          .5.0         .8           2550 WISM         Vol %		20% Recovered	O <sub>F</sub>	1	293	228	233
90% Recovered         °F          473         401           End Point         °F          518         459           % Recovered, 400°F         % F          518         459           % Recovered, 400°F         % F          518         459           1298         API Gravity           90.1           381         Existent Gum         mg/100 ml          7.0         .8           381         Existent Gum         wt %          7.0         .8           1552         Total Sulfur         wt %          .4         .042           1323         Mercaptan Sulfur         wt %          .4         .042           1323         Reid Vapor Pressure         psi         2.0         3.0         2.6           1405         Net Heat of Combustion         MJ/Kg         42.8          43.5           1319         Aromatics         Vol %          5.0         .8           1319         Aromatics         Wol %          5.0         .8           1322         Smoke Point         Wt. %          5		50% Recovered	$^{ m O_F}$	1	374	295	295
End Point         OF          518         459           1298         API Gravity         API Gravity           90.1           1298         API Gravity           90.1           381         Existent Gum         wt %          7.0         .8           1552         Total Sulfur         wt %          .4         .042           1323         Mercaptan Sulfur         wt %          .4         .042           1323         Mercaptan Sulfur         wt %          .001         .0005           1405         Net Heat of Combustion         NJ/Kg          .001         .0005           1405         Net Heat of Combustion         Nol / Kg          .001         .0005           1319         Olefins         Nol / Kg          .25.0         .8           1319         Aromatics         Nol / Kg          .25.0         .8           1312         Smoke Point         Wt. %           .5.0         .8           1550         Wish         Wt. %           .5.0         .8 <td></td> <td>90% Recovered</td> <td>O<sub>F</sub></td> <td>1</td> <td>473</td> <td>401</td> <td>403</td>		90% Recovered	O <sub>F</sub>	1	473	401	403
% Recovered, 400°F         %         —         —         90.1           1298         API Gravity         aR/100 m1         —         —         90.1           381         Existent Gum         wt %         —         7.0         .8           1552         Total Sulfur         wt %         —         .4         .042           1552         Total Sulfur         wt %         —         .4         .042           1323         Mercaptan Sulfur         wt %         —         .4         .042           323         Reid Vapor Pressure         psi         2.0         3.0         2.6           1405         Net Heat of Combustion         MJ/Kg         42.8         —         43.5           1405         Aromatics         Vol %         —         25.0         11.4           1319         Olefins         mm         20.0         —         27.6           1312         Smoke Point         Wt. %         —         5.0         .8           1322         Smoke Point         Wt. %         —         5.0         .8           2550         WISM         Thire          13.6          14.36           277		End Point	o <sub>F</sub>	1	518	459	457
1298         API Gravity         OAPI         45.0         57.0         53.9           381         Existent Gum         mg/100 m1          7.0         .8           1552         Total Sulfur         vt %          .4         .042           1323         Mercaptan Sulfur         vt %          .4         .042           323         Reid Vapor Pressure         psi         2.0         3.0         2.6           1405         Net Heat of Combustion         MJ/Kg         42.8          43.5           1405         Net Heat of Combustion         Vol %          25.0         11.4           1319         Aromatics         Vol %          25.0         11.4           1319         Olefins         mm         Vol %          25.0         11.4           1319         Olefins         mm         Vol %          25.0         11.4           1322         Smoke Point         Wt. %          5.0         8           1322         Smoke Point         Wt. %         13.6          14.36           2550         WISM         Vol %		% Recovered, 400°F	%	1	1	90.1	86.8
381         Existent Gum         mg/100 ml          7.0         .8           1552         Total Sulfur         vt %          .4         .042           1323         Mercaptan Sulfur         vt %          .4         .042           323         Reid Vapor Pressure         psi         2.0         3.0         2.6           1405         Net Heat of Combustion         MJ/Kg         42.8          43.5           1405         Aromatics         Vol %          5.0         3.0         2.6           1319         Aromatics         Vol %          5.0         .8           1319         Olefins         mm         Vol %          5.0         .8           1319         Olefins         wm         Vol %          5.0         .8           1312         Smoke Point         wm         Wis         Wis         11.4         .8           2550         WISM         WISM         WISM          14.36           2776         Particulate Contaminant         mg Koli/g          .015         .005           2276         Filtration Time, 1 gallon	D 1298	API Gravity	OAPI	45.0	57.0	53.9	53.9
1552 Total Sulfur  vt %  Marcaptan Sulfur  vt %  Reid Vapor Pressure  psi  Reid Vapor Pressure  psi  Reid Vapor Pressure  psi  Reid Vapor Pressure  psi  MJ/Kg  42.8 43.5  1319 Aromatics  Vol %  Vol %  Vol %  Vol %  Vol %  Vol %  Nol %	D 381	Existent Gum	mg/100 m1	1	7.0	ω.	9.
Mercaptan Sulfur   wt %  001 .0005     Reid Vapor Pressure   psi   2.0   3.0   2.6     1405   Net Heat of Combustion   MJ/Kg   42.8   43.5     1319   Aromatics   Vol %   25.0   11.4     1319   Olefins   mm   20.0   27.6     1322   Smoke Point   mm   20.0   27.6     Mt. %   Vol %   13.6   14.36     Mt. %   Vol %   13.6   14.36     MISM   WISM   Vol %   10.0     MISM   WISM   MJ/Liter   mg/liter   1.0   .015     Say   Total Acid Number   mg/liter   1.0   .015     Total Acid Number   minutes   15.0     Thermal Stability ΔP   mm Hg   25.0   1.1     Tube Color Code   ASTM Color Code   <3   1.0     Tube Color Code   ASTM Color Code   <3   1.0     Total Acid Number   Minutes   25.0     Tube Color Code   ASTM Color Code   <3   1.0     Tube Color Code   ASTM Color Code   <3   1.0     Total Acid Number   Minutes   25.0     Tube Color Code   25.0	D 1552	Total Sulfur	wt %	!	4.	.042	.05
323       Reid Vapor Pressure       psi       2.0       3.0       2.6         1405       Net Heat of Combustion       MJ/Kg       42.8        43.5         1319       Aromatics       Vol %        25.0       11.4         1319       Olefins       mm       20.0        27.6         1322       Smoke Point       mm       Wt. %        27.6       .8         1322       Smoke Point       Wt. %       13.6        27.6       .8         550       WISM       WISM       70.0       90.0       .0         2576       Particulate Contaminant       mg/liter        1.0       .37         3242       Total Acid Number        .015       .006         2276       Filtration Time, 1 gallon       minutes        .015       .0         2276       Filtration Time, 1 gallon       mm Hg        .0       .0         3241       Thermal Stability ΔP       mm Hg        .2       .0         Tube Color Code       ASTM Color Code        .3       1.0	D 1323	Mercaptan Sulfur	wt %	1	.001	.0005	.0004
1405 Net Heat of Combustion MJ/Kg 42.8 43.5 1319 Aromatics Vol % 25.0 11.4 1319 Olefins Imm Vol % 5.0 .8 1322 Smoke Point Imm Vol % Imm Zo.0 27.6 1325 WISM VISM VISM VISM VISM VISM Img/liter 1.0 .015 1324 Total Acid Number Imp KOH/g015 .006 12576 Filtration Time, 1 gallon Imputes Imputes Imputes Imputes Imputes Impute Imputes Impute Imputes Impute Imputes Impute I	D 323	Reid Vapor Pressure	psi	2.0	3.0	2.6	5.6
1319 Aromatics Vol % 25.0 11.4 1319 Olefins Imm Vol % 5.0 .8 1322 Smoke Point Imm Vol % 5.0 .8 1322 Smoke Point Imm Wt. % 13.6 14.36 2550 WISM VISM VISM 70.0 90.0 2776 Particulate Contaminant Imp/liter 1.0 .37 25776 Particulate Contaminant Imp/liter 1.0 .015 2276 Filtration Time, 1 gallon Imm Hg 15.0 5.1 2341 Thermal Stability ΔP Imm Hg 25.0 1.1 2450 Tube Color Code ASTM Color Code <3 1.0	D 1405	Net Heat of Combustion	MJ/Kg	42.8	1	43.5	43.5
1319 Olefins  132 Smoke Point  mm  Vol %  Wt. %  13.6 27.6  25.0 WISM  25.0 WISM  25.0 WISM  WISM  26.0 14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.6  14.36  27.7  14.36  15.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  16.0  27.6  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.7  27.	D 1319	Aromatics	Vol %	!	25.0	11.4	10.9
322   Smoke Point   mm   20.0     27.6     250   WISM   WISM   70.0     2576   WISM   mg/liter     1.0   37     3242   Total Acid Number   mg KOH/g     1.0     2276   Filtration Time, 1 gallon   minutes     15.0     3241   Thermal Stability ΔP   mm Hg     25.0     Tube Color Code   ASTM Color Code     <3   1.0	D 1319	Olefins	Vol %	1	5.0	∞.	8.
% Hydrogen Wt. % 13.6 14.36 2550 WISM 70.0 2776 Particulate Contaminant mg/liter 1.0 .37 3242 Total Acid Number mg KOH/g015 .006 2276 Filtration Time, 1 gallon minutes 15.0 5.1 3241 Thermal Stability △P mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	D 1322	Smoke Point	um	20.0	!	27.6	28.1
2550 WISM 2776 Particulate Contaminant mg/liter 1.0 .37 3242 Total Acid Number mg KOH/g015 .006 2276 Filtration Time, 1 gallon minutes 15.0 5.1 3241 Thermal Stability △P mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	(c)	% Hydrogen	Wt. %	13.6	!	14.36	1
2776 Particulate Contaminant mg/liter 1.0 .37 3242 Total Acid Number mg KOH/g015 .006 2276 Filtration Time, 1 gallon minutes 15.0 5.1 3241 Thermal Stability ΔP mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	D 2550	WISM	WISM	70.0		0.06	0.06
3242 Total Acid Number mg KOH/g015 .006 2276 Filtration Time, 1 gallon minutes 15.0 5.1 3241 Thermal Stability ΔP mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	D 2776	Particulate Contaminant	mg/liter	!	1.0	.37	4.
2276 Filtration Time, 1 gallon minutes 15.0 5.1 3241 Thermal Stability ΔP mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	D 3242	Total Acid Number	mg KOH/g	i	.015	900.	900.
3241 Thermal Stability $\Delta P$ mm Hg 25.0 1.1 Tube Color Code ASTM Color Code <3 1.0	D 2276	Filtration Time, 1 gallon	minutes	1	15.0	5.1	5.0
ASTM Color Code <3 1.0	D 3241	Thermal Stability AP	rum Hg	1	25.0	1.1	.83
		Tube Color Code	ASTM Color Code	1	<3	1.0	. 84

(c) calculated from equation in 1976 Annual Book of ASTM Standards, Volume 25.

# SECTION V

APPENDIX A - Mean Values and Frequency
Distribution for 1978 Data

99	HISSING VALUES	0.00 REPORTS	168	MISSING	. 59 REPORTS	213	MISSING VALUES	36 15.14 RE PORTS	66	HISSING VALUES	1.67 REPORTS
SAMPLES	VAL	PRCHT OF RE	SAMPLES	VAL	PKCNT OF RE	SAMPLES	VAL	PRCNT OF RE	SAMPLES	VAL	PRCNT OF RE
.99			169.			251.		•	60.		
REPORT	6TR 165.	100.00	REFORT	61R 165.	4.17	REPORT 2	6TR 165.	100.00	REFORT	61K 165.	100.00
14.5	67R 160. LE0 165.	18.18 95.45	13.8	6TR 160. LEO 165.	4.17	12.0 F	6TR 160. LEO 165.	.94	11.6	618 160. LEQ 165.	100.00
SIGMA	678 155. LEQ 160.	12.12 77.27	SIGHA	6TR 155. LEG 169.	7.14 91.67	SIGHA	155. 160	2.82 99.16	SIGHA	618 155. LEG 160.	100.00
147. 5	678 150 150	7.53	140. S	6TR 150. LEO 155.	6.55 84.52	135. S.	678 150 150	7.93	133. \$	678 150 150	130.00
1EAN	67R 145. LED 150.	13. ó4 57. 58	46 AN	67.8 145. LEG 153.	8.33 77.98	4E AN	145. LE0 150.	7.94	HEAN	678 145. LEG 150.	6.78
-	618 140 160 145	10.61	ř	678 140 LEG 145	8.93 69.64	Ŧ	61R 140. LED 145.	13.62	Ŧ	140.	15.25
4 930	135. 150. 140.	13.64	L 950	135. 140.	26 16.67 60.71	<b>3 9 3</b> 0	135. 135. 146.	30 14.06 66.67	016	61k 135. LF0	13.56
. 14 541	672 130. Lfu 135.	9.09	BUILING PT.	678 139. LEQ 135.	17.26 44.15	÷	67R 133. Lta 135.	12.68 52.50	BOILING PT.	678 130. LEO 135.	15.25 57.63
71. 30.LING	125. 134.	10.61		125. 125. LEG	26. 79	INIT. ROILING	125. 125. 130.	22. 54 39.51	.•	125. LFG 130.	11, 14, 64, 42, 37
LATH INTE	675 120. LF1 125.	. 35	.LATH TH]T	67.8 120. 150.	5.95 12.50	z	677 129. LFO 125.	5.16 17.37	LATH INE	678 123. LEO 125.	6.78 23.73
OTSTILLAT	616 115. 150	1.52	LISTILLAT	670 115. 150	5.00	CISTILLAT	67F 115. 150	6.10 12.21	CISTILLAT	678 115. 120	10.17
LISTRACT 1	115.	3.03	DISTRICT 2	115.	3.57	DISTRIC 3	115.	6.10 6.10	DISTUICT 4	115.	6.78
17		F 25 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10		Fr ED FC NT ACUM	10		FOED	10		PENT PONT ACUM

Table III. Distillation, Initial BP

77. SAMPLES 76	MISSING VALUES	1.30 PMCNT OF REPORTS	2. SAMPLES 2	MISSING	0.00 PRCNT OF REPORTS	9. SAMPLES 9	MISSING	0.00 PECNT OF KE PORTS	17. SAMFLES 17	MISSING	PECNT OF REPORTS
REPORT 7	61R 165.	1.32 100.00	REPORT	61R 165.	100.00	REPORT	6TK 165.	100.00	REFORT 1	61K 165.	1,000
11.3 R	67R 164. LEG 165.	5.26 98.68	. 9	6TR 160. LEG 165.	100.00	11.2 R	67P 160. LEG 165.	100.00	9.9	618 160. LEG 165.	100.00
SIGHA	678 155. LEG 160.	3.95	SIGHA	618 155. LEQ 160.	100.00	SIGNA	6TR 155. LEG 160.	11.11	SÍGMA	61R 155. LEG 160.	5.86
139. S.	6TR 150. LEG 155.	6.58	125. S	150. 150. LEG 155.	100.00	137. S.	67R 150. LEO 155.	36.39	142. SI	67R 150. LEG 155.	5.88
HEAN	6TR 145. LEG 150.	3,95	HE AN	672 145. LEG 150.	100.00	4E AN	678 145. LEG 150.	11.11 88.89	1E AN	678 145. LEO 150.	5.38
7	6TR 140. LEG 145.	11,477	•	678 140 145	100.00		61R 140. LEQ 145.	11.11		67R 140. Lt0	35.25 82.35
DEG F	135. 135. 140.	21.05	F 930	135. 135. 140.	106.00	316 F	135. 135. 140.	22. 22 66. 67	9 9 30	67F 135. LC0 140.	20.41
SCILING PT.	678 130. LF0 185.	25. Uu 43. 42	BUTLING PT.	6TR 130. LEQ 135.	100.00	ING PT.	67.8 130. 150 135.	00.00	ING FT.	618 130. LEO 135.	17.65
	125. 125. 150.	9.21		678 125. LEO 130.	150.00	IT. BUILING	67. 125. LEO 136.	33.33.44	IT. POILING	674 125. LFG 130.	
DISTILLATM INIT	120. 120. 125.	5.26 9.21	DISTILLATH INIT	67K 120. LED 125.	0.00	DISTILLATN INI	676 120. 120	0.00	LISTILLATH INIT.	676 120. Le 0 125.	0.00
5 DISTI	618 115. LEQ	2.63 3.95	011311	6TR 115. LEO 120.	50.00		618 115. LEO 120.	11.11		618 115. LEU 120.	0.000
DISTRICT 5	115.	1.32	DISTRICT	115.	0.00	OISTRICT 7	115.	0.00	DISTRICT 8	115.	6.00
10		PE P	10		PCNTD ACUM	10		Fr ED AC UP	10		FP ED FCNT ACUM

SAMPLES 66	FISSING	0.00 PKCNT OF PEPORTS	SAMPLES 168	MISSING	. 59 PACNT OF REPORTS	SAMPLES 248	MISSING	3 1.20 PHCNT UF REPORTS	SAMPLES 60	MISSING	0.00 PRCNT OF REPORTS
PEFORT 66.	67k 235.	1.52 10.03	REPORT 169.	6Tk 235.	7.74 100.00 P	PEPORT 251.	6TR 235.	10 4.03 100.00	FEFORT 60.	6Tk 235.	3.33 100.00 P
16.5 RE	67R 230. LEQ 235.	98.66	17.4 RE	61P 230. LEG 235.	1.73	21.0 PE	618 230. LEQ 235.	19. 95.97	16.6 FE	676 230. LEO 235.	1.67
SIGMA	61R 225. LF0 234.	36.86 3.94	SIGHA	618 225. LEG 230.	7.14	SIGHA	61R 225. Leg 230.	. 81 95.56	SIGMA	6TR 225. LEG 230.	3.33
195. S.	618 220. LEG 225.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	. sos	6TR 223. LCG 225.	4.76 83.33	196. S.	618 220. LEG 225.	2.02	202. S.	6TR 220. LEG 225.	6.67
HEAN	215. LEO 224.	0.00	4E AN	61K 215. LFO 226.	20 11.90 78.57	HEAN	6TR 215. LEG 220.	9.68	MEAN	67K 215. LEG 220.	6.67 65.0u
7	618 210. LFQ 215.	1.52	7	6TP 210. LEG 215.	7.14	T	618 210. LEQ 215.	7.66 83.66	τ.	6TR 210. LFQ 215.	10.06
4	205. LEG 210.	12.12 92.42	ı.	275. LEG 216.	15.48 50.52	u	215. LL0 210.	29 11.69 75.46		67F 295. LEO 210.	66.33
FEG. 0EG	260. LEQ. 295.	18.10	FFCCVERED, DEG	618 200. LFQ 205.	11.31	FECCUSKED, DES	618 200. LEQ 205.	0.45	. ED, 056	67R 260. LF 0 205.	11.67
X LECOVEFEG.	145. LFG 296.	16.67 62.12		195. LFD 200.	7.14		676 195. LEO	57.26 57.26	% A.ECCIVE	195. 285.	13 48 48 33
LLATH 10%	130. LEQ 195.	7.50	LL ATM 10%	675 149. 160 195.	7.74 25.60	CISTILLAT" 10%	57.4 190. LEO 195.	6.35	1 TETH 10%	61A 140. LFQ 195.	35.00
1 DISTILL	135. 150 190	10.61	2 CISTILLATM	678 135. LFQ 190.	20 11.90 17.86	3 (ISTI	135. 150 190.	32 12.90 40.73	4 CISTILLATM	618 185. 180	13.33 26.33
DISTRICT	185.	27.27	DISTRICT	165.	5.95	DISTRICT	185.	27.82	DISTRICT	185.	15.00
0.		FORM	6		FP EG ACUM	6		FORT PCNT	5		PONT

Table IV. Distillation, 10% Recovered

77. SAMPLES 76	MISSING	1.30 PHONT OF REPORTS	2. SAMFLES 2	MISSING VALUES	0.00 DACNT OF REPORTS	9. SAMPLES 9	HISSING	0.0 0.00 PRCNT OF REPORTS	7. SAMPLES 16	HISSING	5.88
REFORT 7	61k 235.	100.00	REPORT	61R 235.	100.00	rt POR1	61A 235.	100.00	FEPORT 17	6TR 235.	0000
12.2 86	678 230. LEQ 235,	2.63 100.00	14.1 86	678 230. LEO 235.	0.00	12.3 et	61R 230. LEQ 235.	100.00	14.5 FE	678 233. LEO 235.	000
SIGHA	6TR 225. LF0 230.	6.58	SIGHA	613 225. LEG 233.	50.00 100.00	SIGHA	678 225. LEU 230.	100.00	TH 9IS	618 225. LEO 233.	12.50
206. \$1	678 220. LEO 225.	7.99 90.73	218. 51	678 220. LEG 225.	0.00	206. SI	618 220. LEQ 225.	11.11 100.00	201. SI	617 220 150 225	0.00
4E AN	678 215. LE 0 220.	5.26	4E An	6TR 215. LE0 220.	0.00	HEAN	678 215. LEG 220.	11.11 88.89	ACAN	67 8 215. LEG 220.	0.00
Ŧ	618 210. 160 215.	6.58	Ŧ	6TR 210. LEQ 215.	00.00	¥	67R 210. LEQ 215.	22.22 77.76	ž	618 210. LEQ 215.	0.25
Ŀ	205.	21.35	L	615 150 210	50.00		616 205. LEG 210.	11.11 55.56	L.	67F 205. 110 210.	18.75
EU, NEG	618 209. LEQ 205.	15.79	5.00 · 03.0	618 200. 150 205.	0.00	FU. 916	618 200. L.O 205.	11.11	RFFOVERFU, DEG	676 200. 160 205.	6.25
SECOVERED	617 195. LEO 200.	17.11 34.21	PECOVETED, DE	671 195. 160 200.	3000 3000	RECOVEREU.	678 195. LEG 200.	33.33		676 195. 160 200.	6.25
LETH 10%	67.8 193. 195.	9.21	L ATM 192	67 F 1 2 0 . 1 2 5 .	0.00 0.00 0.00 0.00	LATN 192	677- 130. 135.	11.11	LATH 192	678 190. 150 195.	18.75
CISTLLITA	613 145.	7.95	DISTILLATION	678 195. 190.	200	DISTILLATA	678 185. 190	22.22	LISTILLATA	675 185. 190	14.75
OTSTOLET S	195.	3.05	9 13141810	135.	0.00	DISTRICT 7	LEG 195.	0.00	DISTRICT &	165.	12.50
01		FC ED FC NT ACUM	10		FC F	018		FF EQ FCNT ACUP	916		FORT

SAMPLES 65	HISSING	1.52 PRCNI OF REPORTS	SAMPLES 159	MISSING	5.92 PRCNT OF REPORTS	SAMPLES 250	PISSING	1 • 4 8 PRCNT OF REPORTS	SAMPLES 60	MISSING VALUES	0.00 PACNT OF REPORTS
17.1 PEPONT 66.	61R 61K 265. 275. LEQ 275.	1.54 3.00 100.00 100.05	20.7 NEPORT 169.	678 678 265. 275. LEO 275.	5.66 4.40 95.60 100.00	22.5 REFORT 251.	GTR GTK 265. 275. LEQ 275.	11 4.40 1.60 98.46 100.00	23.3 KEPORT 60.	GTR GTR 265. 275. LEQ 275.	1.67 6.67 93.33 100.00
SIGHA 1	678 255. 160 265.	98.46	SIGMA 2	618 255. LEG 265.	3.14	SIGHA 2	618 255. LEG 265.	94.00	SIGMA 2	6TR 255. LEO 265.	6.67
¿10. S	245 LED 255	98. 98. 98.	232. S	618 245. 150 255.	6.92 86.73	226. S	67.8 245. LEG 255.	8.40 89.60	229 <b>.</b> S	618 245. LEO 255.	11.67
4E AN	618 235. LEG 245.	1.54 93.65	4E AN	618 235. LE0 245.	15.09	1E AN	678 235. LE 0 245.	48 19.20 81.20	4E AN	6TR 235. LEO 245.	6.67
	61R 225. LED 235.	27.69 92.31		678 225. LEG 235.	27.67		61R 225. LED 235.	26 19.40 62.00		6TR 225. LFQ 235.	11.67
L	215. 225.	32.31	u. C	614 215. LE 0 225.	13. P4 37. 11	u.	215. LEO 225.	35 14.60 51.60	u. O	61F 215. LTO 225.	21.67 55.00
ж О. О. Э. С	67K 265. LEG	7.69 32.31	PECOVEREN, DEG	6.6 235. LEQ 215.	19.50	FEGOVEFED, DEG	678 205. LEU 2154	17.63 37.60	õ	678 205. LEU 215.	11 18,33 33,33
29% RECOVERED.	199. 199. 209.	10.77	29% PECOVE	67. 195. LF3	3.77	210024 267	618 195. LEO 205.	11.66	20% PEROVERED,	678 195. Lko	15.00
OISTILLAT4 20	61.5 1.5. 1.5.	12. 31 13. 65	UISTILLAT" 29	67.5 15.5 19.5	1.26	USSTILLATE 20	67 K 115. 135.	21.00.40	DISTILLATM 20	67.8 165. 195.	0.00
1 SISTI	678 175.	1.54	17210 5	678 175. LFD 185.	0.00	3 1.1571	175. 175. LEG 185.	500	11210 4	67F 175. 150 185.	0.00
PISTRICT	LE0 175.	6000	DISTRICT	LE9 175.	0.00	PISTRICT	LEG 175.	0.00	DISTRICT	LEG 175.	00.00
•		FT FO FC NT	0		ACUM ACUM	٠		PC NT	٥		FE ED FONT

Table V. Distillation, 20% Recovered

11 8	MISSING VALUES	0.00 REPORTS	8	HISSING VALUES	0.00 REPORTS	<b>б</b>	MISSING	0.00 REPORTS	\$ 16	MISSING	5.88 REPORTS
SAMPLES	13	PRCNT OF R	SAMPLES	r 4	PALNT OF R	SAMFLES	r d	PKCNT OF R	SAMPLES	E 4	PRUNT OF E
11.			5.		ā	<b>,</b>			17.		
REPORT	6Th 275.	100.00	REPORT	6TR 275.	100.00	REFORT	6Th 275.	100.00	REPORT	6TK 275.	0.00
15.6 8	67F 265. LEG 275.	2.60	38.2 K	678 265. LEO 275.	50.00 100.00	12.0 R	678 265. LEQ 275.	106.00	12.3 8	678 265. LEQ 275.	0.00
SIGHA	618 255. LEQ 265.	9.05	SIGMA	6TR 255. LEO 265.	00.00	SIGHA	612 255. LEG 265.	100.00	SIGMA	GTR 255. LEG 265.	0.00
231. SI	6TR 245. LEG 255.	7.79	244. SI	61R 245. LEG 255.	0.00	230° SI	678 245. LEG 255.	11.11	.62	618 245. LEQ 255.	12.50
4EAN 2	618 235. LEU 245.	6.49	HEAN 2	618 235. LEQ 245.	0.00	1E AN 2	612 235. LEG 245.	22.22 88.89	1E AN 2	618 235 LEG 245	12.53
¥	67K 225. LEG 235.	26.36 74.03	¥	612 225. LEQ 235.	00.05	#	61R 225. LE0 235.	22.22	#	678 225. LEQ 235.	31.25 75.00
L	215. L16. 225.	25. 52 25. 57 37. 66	L.	67 F 215. LFQ 225.	50.00	L.	616 215. 1 r 0 225.	1	L	215. Lso 225.	31.25
ECCVFFEC, DEC	678 205. LEQ 215.	6. 45. 9.09	970	678 205. LEQ 215.	0.00		205. 110 215.	3.30		678 205. LEQ 215.	12.50
RECEVER	677 195. LEG 205.	2.60 2.60	RECCVEREC,	674 195. LFG 205.	30.0	HECOVERED, DEF	195. LFO 265.	0 • 0 0 • 0	RLCOVEREU, DEG	617 195. LEO 205.	333
DISTILLATM 20%	67K 1°5. L'0 195.	070	DISTILLATN 20%	61h 135. LEG 145.	9.00.00	DISTILLATA 28%	673 1185 1195	00000	ATH 20%	67.9 105. 105.	0.00
PISTILL	678 175. 150 155	0.00	บารราน	61k 175. LEO 185.	0.000	DISTILL	518 175. LED 155.	00000	וצווררענא	678 175. 180 135.	99000
DISTRICT 5	175.	0000	DISTRICT 6	LEG 175.	0.00	DISTRICT 7	175.	0.000	DISTRICT &	LE0 175.	0.00
0151		PCNT PCNT	DIST		FF EO FC NT	0151		FRED PCNT ACUM	0151		PC NT ACUM

SAMPLES 66	"ISSING	0.00 PRONT OF REPORTS	SAMPLES 157	MISSING VALUES	12 7.10 PRCNT OF REPORTS	SAMPLES 244	MISSING	2.79 PACNT OF REPORTS	SAMPLES 60	MISSING	0.00 PACNI OF REPORTS
FFPORT 56.	67.k 370.	100.00	KE FURT 169.	6Tk 370.	100.00	PEFORT 251.	6TŘ 376.	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FORT 60.	6TŘ 370.	160.00
21.7 6	678 355. LFQ 370.	1.52	22.0 KE	678 355. LEG 370.	1.27	27.7 PE	618 355. LEG 370.	2.05	26.6 KE	618 355. LEG 370.	100.00
SIGFA	340. 140. 155.	9.00	SIGHA	340. 160 355.	0.00	SIGHA	340. 355.	3.69.72	SIGMA	340. 340. 355.	100.00
305. SJ	325.	7.58	285. S.	67R 325. Lec 340.	5.10 90.73	302. S	325. 325. 340.	9.84	283. S	678 325. 150 340.	5.00
AE AN	310. LEU 325.	12.12 81.82	1EAN	310. 320. 325.	7.01 93.63	4E AN	310. LEG 325.	62 25.41 84.43	74	313. 150 325.	13.33 95.00
•	67k 295. LEQ 310.	36.30	Ī	61K 295. Leo 310.	10.83 86.62	•	6TR 205. LEO 310.	58 23.77 59.02		295. LEQ 310.	11 18.33 91.67
	23.6. 23.6.	31. 62 39. 35		678 230. 150 295.	36 22.93 75.80	u	290. 150. 295.	34.75 35.25	u.	2000	13.33
ec, 016	673 265. LEO 280.	7.58	530 °03.	6. k 265. LEG	35.67 52.87	, FO, 056	678 265. LEQ 280.	9.02	.tu, 0f6	67P 265. LFQ 280.	13.33
S PECUVENEC,	677 256. LEG 265.	0.00	Z MECCUEHED.	250. LF G	26 16.56 17.20	Z KECOVERED,	611 250. LEO 265.	6.15 11.48	2 PECOVERE	670 250. LFG 265.	26.67 36.67
LATN 50%	67 K 235.	0.00	ATN 59	67.F 235. LEQ 250.		LATN 50%	255. LED 250.	3.63	5.0	235. LEG 250.	9.33 10.00
PISTILLATM	223. 153. 235.	3.00	מוצצורר :	678 220. 160 235.	1 36.	3 DISTILLATIN	678 220. LEQ 235.	1.54	. CISTILLATY	67.8 22.0. LE 3 235.	1.67
PISTRICT 1	220.	0000	CISTRICT 2	220.	00.0	DISTRICT	LEG 220.	0.00	STRICT 4	220.	0.00
10		75 70 70 70 70	10		PCNT ACUT	10		PC NT ACUM	10		AC UT

Table VI. Distillation, 50% Recovered

SAMPLES 76	MISSING	1.30 PAGNT OF REPORTS	SAMFLES 2	MISSING	0 0 0 0 0 PELNT OF REPORTS	SAMFLES 9	MISSING	0.00 PRCNT OF REPORTS	SAMPLES 17	MISSING	PHONT OF REFORTS
77.			2.			6			17.		
RFPORT	5TA 370.	100.00	FEPORT	373.	100.00	FEPCRT	370.	100.00	FEFORT	976. 370.	100000
28.9 8	355. 160 370.	100.001	24.7 5	678 355. LEQ 370.	100.001	21.2 F	678 355. LEG 370.	11.11	21.6	678 355. LEO 370.	5.88
SIGHA	341. LEG 355.	6.55 100.00	ысна	614 340. LEG 355.	50.00	SIGHA	355.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SIGMA	674 340. LEG 355.	5.88
\$ .645	325 160 340	93.42	328.	678 325. LEG 340.	9.00	302. S	3 5 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	0.10	320° S	525. LEO 340.	29.41
HEAN	310. LEO 325.	9.21	NA 34	67R 310. LEG 325.	0.00	JE AN	310. LEG 125.	0.00	4E AN	313. LEG 325.	23.53
r	255. 150 310.	11.64	7	61k 295. LEG 310.	50.00	7	677 295. LEO 310.	68.56	7	61k 295. LEQ 310.	29.41 35.29
i.	618 223 150 265	63.16	l.	6. F 280. 150. 235.	0.00	u.	2° 6. 2° 6. 2° 6. 2° 6.	33.3	u.	677 290 295	0.00 0.00 0.00
.E0 , 0FG	265. LFD 200.	27. 53.53. 53.95	9 30 603	61× 265. LFQ 289.	00.00	PECCVERED, DEG	265. 1100	0.00	.to, 026	617 265. LFG 280.	5.38
X RECEVEFE	671 255. LEG 265.	15, 79	C HECOVERED,	250. 124. 265.	0.00		67. 250. LFG 265.		. RECONERED.	67: 255. 186	9.00
TEETH 50%	67.8 235. 1.50 250.	2.63	LATK 50%	67. 235. LEO 250.	0.00	202 MIA 50%	616 235. 1.0 250.	0.00 0.00 0.00	LATH 50%	67.8 235. LEO 251.	0.00
LISTIC	67.0 220. 160 235.	0.00	LISTIL	678 220. LEG 235.		CISTILLATM	678 220. 150 235.	00.00	CISTILL	678 220. LF0 235.	3.00
DISTRICT 5	220.	0.000	OISTRICT 6	LEG 220.	0.00	DISTRICT 7	LE0 220.	.00	DISTRICT P	220.	00.00
10		AC CHI	.10		FEED FCNT ACUM	10		PP	010		PPES ACUM

SAMPLES 66	HISSING	0.00 PRLNT OF REPORTS	SAMPLES 159	MISSING	10 5.92 PRCNT OF REPORTS	SAMPLES 250	MISSING VALUES	1 • 40 PACNT OF REPORTS	SAMPLES 60	MISSING	0.00 PRCNT OF REPORTS
FFP OR1 66.	470.	100.00	REPORT 169.	6TR 470.	100.00	REFORT 251.	470.	100.00	REPORT 60.	470.	100.00
12.4 F	678 455. LEQ 470.	100.00	37.5 R	618 455. LEQ 470.	1.26	28.2 R	6TR 455. LEQ 478.	100.00	31.3 R	67R 455. LEG 470.	100.00
SIGHA	61R 440. LEG 455.	12.12 100.00	SIGMA	678 440. LEG 455.	1.89	SIGHA	6TR 440. LEO 455.	7.66	SIGHA	67R 440. LEG 455.	100.00
428. SI	4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	34 51.52 87.88	388. SI	618 4259. 1440.	23 14.47 96.96	408. SI	678 425. LEQ	23.30	384. SI	678 425. 440.	1100.00
1FAN 1	618 410. LEG	30.30	4E AN	678 410. LEG 425.	25 15.72 82.39	4EAN	618 410. LEG 425.	28.40 72.40	1EAN 3	6TR 410. LEQ 425.	13.33 88.33
4.	678 395. LLQ 410.	1.52	ř	67k 395. LFQ 410.	13.84	¥	365. 160 410.	18.46 44.00	4	61K 395. LFQ 410.	13.33
14	349. 140	4.55	u	340.	12.58 52.63	u	330. 150 395.	31 12.40 25.60	L	3.00 1.50 3.05	13.33 61.67
FO, 056	678 365. 150 380.	0.00	Fr. 986	67 K 365. LFQ 380.	16.98 40.25	FECOVERED, DEG	678 365. LFU 360.	4.00 13.20	FD, 0EG	678 365. 150 360.	15.00
PECCVERFO,	61° 356. 1°0 365.	00 00 00	FECTVEFFT, DE	616 350. LEG 365.	5.66		350. LFC 365.	93.50	recovered.	350. LEO 365.	13.33 33.33
205 1.17 1	33.5.	3.00	LATA 90%	675 335. LFQ 350.	7, 55	LATN 902	335. LEQ 350.	3.23 5.03	ZNE NTAL	335. LEQ 350.	11 18.33 20.00
LISTILL	335.	0.00	DISTILLATA	678 323. 150 335.	5.03 16.06	UTSTILLATM	67 P 72 U. LEQ 335.	1.60	DISTILLATH	678 720. 160 335.	1.67
UISTRICT 1	329.	0.00	DISTRICT 2	320.	50.6	DISTRICT 3	320.	1.20	DISTRICT 4	150 320.	0000
0.13		FC CMT	910		FOED FCNT ACUM	0.13		FONT	918		FP FO FCUM

Table VII. Distillation, 90% Recovered

SAMFLES 77	hISSING VALUES	0.00 0.00 PRCNI CF REPORTS	SAMPLES 2	HISSING	0.00 PRCNT OF REPORTS	SAMPLES 9	MISSING	PACINT OF REPORTS	SAMPLES 17	MISSING	0.00 PRCNT OF REPORTS
11.			2.			6		003	17.		000
PEPORT	470	100.00	REPORT	470 470	100.00	FEFORT	61 K	100.00	FEFORT	67k	100.00
4 2.07	455. LED	1.30	9	455. LED 470.	100.00	7.3	6TR 455. LEO 470.	100.00	19.6	618 455. LEO	100.00
SIGHA	6TR 4413. LEG 455.	12.99 98.70	SIGHA	6TR 440. LEG 455.	100.00	SIGHA	6TP 44J. 150	10.00	SIGNA	4 L L L L L L L L L L L L L L L L L L L	5.86 100.00
394.	678 428.	19.48 85.71	413. S	4 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +	100.00	.804	672 425 440	100.00	413. S	678 425 611 645 60	41.18
1E AN	67R 410. LEO 425.	11.69	NATE	410. LEG 425.	100.00	4E AN	67.8 410. LEQ 425.	14.44	A A	618 410. LEO 425.	23.53
	395. LEG 410.	10.39	*	395. LED 410.	300	,	395. 120 110.	55.56 55.56	·	61A 395. LEQ	5.86
4	9 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1.30	u	305.	0.00	u	1.00	0.00	ir.	33.0 33.0 39.5 39.5	23.53
Fro, ors	618 365. 120 380.	5. 4.2. 8.6. 8.6. 8.6.	930 (034	514 155. 150 380.	0.00	FEC. DEG	365. Liu 380.	00.00	, EC., DCG	67R 365. LEO \$60.	5.88 5.38
K RECOVEERD.	350 350 365	14.29 36.36	Z KECOVEFE	678 750 150 365	30.0	Y PECCVER	350. 150. 155.	0.00	S PECOVEFEL,	67. 350. 186	300
Lath 90%	33.5 15.0 35.0	16.65	9.0	38.5.	9.00	706 NIJT	67.8 335. 1.0 350.	0.00	260 1.177	335.	0.00
LISTILLATA	67.8 12.0 13.5 13.5	5.19	רוצדוונהדי	61.25 8.35 8.50	9.30	. רוצבודרענה	677 720.	0.00	OISTILL <sup>£T</sup> "	33 S	9.00
GISTRICT 5	320.		OTSTPICT 6	320.	00.00	DISTRICT 7	320.	305	DISTRICT 8	320.	0.00
10		FL EG FCAT ACUM	10		FCNT FCNT ALUM	10		PRED PCM	10		FE NT AC UM

Fable VIII. Distillation, End Point

77. SAMPLES 76	MISSING	1.30 PACNT OF REPORTS	2. SAMPLES 2	MISSING	0.00 PECNT OF REPORTS	9. SAMPLES 8	MISSING	11.11 PRUNT OF REPORTS	17. SAMPLES 17	MISSING VALUES	0.00 PACNT OF REPORTS
REPORT	67R 530.	100.00	REPORT	550.	100.00	REPORT	61R 530.	100.001	REFORT	67K 533.	100.00
36.7 20	518. 15. 160 530.	100.00	4.2	518 515 530	100.001	9.	67R 515. LED 530.	100.001	16.1	515. LEQ 530.	100.001
SIGHA	513 500. 515.	10.53	SIGHA	520. 520. LEU 515.	100.00	SIGHA	500. LEG 515.	160.00	SIGHA	500. 500. LEG 515.	100.001
459. 51	7000 9000	25.00	447. 53	500°	100.00	465. 51	91.69 90.00 90.00	100.001	471. S.	67 R 4.35. LEG 500.	35.29 100.00
1E AN	613 669 669	10.53	ACAN	64 7 2 5 4 8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	103.001	N T J	478. 478.	25.00	JEAN	67 8 67 9 68 9	0.00
+	678 455.	11.004	¥	618 455. LEO 470.	10.001	*	67R 455. LEQ	55.50	•	672 155	52.94
	6.00	7.69		67F 4.0. LEO	100.00		67 F 11.0 455.	12.50		6.55 6.50 6.50	11.76
<b>3</b> 930	678 425. LEO	34.21	F 6 5	61R 425. LFO	0.00	9	67 F 42 S	0.00.	2 9 30	425. LEQ 440.	0.00
PCIAT.	67: 410. 425.	22.37	. NIOG	61. 413.	9.00	FOINT,	£10.	0.00	POIN.	67F 410. LEG 425.	00.00
PATA ENT	735. 113.	7. 8.9 11.84	LATH CHE	335. LEQ	0.00	LATA END	345. 110.	000	LATH END	395. 150 410.	0.00
LISTILLATA	540. 150.	2.63	GISTILLATM	740. 140. 345.	0.00	DISTILLATA	360. LED 395.	00.00	DISTILLATIN	330. 150 335.	00.00
DISTRICT 5	380.	1.32	01STRICT 6	360.	00.00	OTSTRICE 7	380.	000	OISTRICT 8	300.	0000
015		PE ED PC UNI	010		FPED	210		POR PECUM	013		555

612 56.0 LEQ 51.0
3.23 9.00 6.45 6.45
678 678 50.3 51.0 1F0 LEO 51.0 52.0
5.13 8.33 5.13 13.46
61R 6'R 50.0 51.0 1E0 LE0 51.0 52.0
2.39 10.76 3.19 13.04
676 678 50.0 51.0 1.0 1.0 51.0 52.0
1.69 1.69 16.95 1.69 3.39 20.34

10	DISTRICT 5	GRAVITY,	056	Ica			Ŧ	HEAN	52.4 51	SIGMA	2.49 FE	REPORT	.11.	SAMPLES	72
	LEG 47.0	678 47.0 LEG 48.0	618 48.0 49.0	678 49.0 LEQ 50.0	51.0 51.0 51.0	51.0 51.0 52.0	6TR 52.0 LEQ 53.0	53.0 LEO 54.0	54.0 1E0 55.0	55.0 1.0 56.0	56.0 56.0 57.0	67.6 57.0		MISSING	SING
FORES	2.78	5.56	6.94 15.28	2.76	6.94 25.00	36.11	6.94 43.06	27.78	22.22 93.06	4.17	2.78 100.00	100.00	PRC	PRCNT OF REP	6.49 REPORTS
10	DISTRICT 6	GRAVITY,	DEG	AFI			Æ	HEAN	54.5 SI	SIGHA	1.91 8	FEFURT	5.	SAMPLES	N
	LF0 47.0	678 47.0 150	7 5 5 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5	617 49.0 50.0	51.0 51.0	676 51.0 150 52.0	678 52.0 LEA 53.0	67.8 53.0 LES 54.0	518 54.0 55.0	678 55.0 LEG 56.0	67R 56.0 LEG 57.0	67R 57.0		MISSI	MISSING
PCNT PCNT ACUM		000.0	0000	000	0.00	000	0000	50.00	00.00	50.00	0.00	100.00	PRCA	PRUNT OF REPO	0.00 REPORTS
10	DISTRICT 7	GRAVITY,	956	100			Æ	MEAN	55.3 Si	SIGMA	36 86	REPORT	;	SAMPLES	ď
	LEG 47.0	678 47.0 1.50 48.0	6.00 6.00 6.00	67 F 49.0 1.7 G 50.0	675 50.0 LEQ 51.0	6.8 51.0 1.0 52.0	678 52.0 LEQ 53.0	67 h 53 0 LF 0 54 • 0	55 E S S S S S S S S S S S S S S S S S S	614 55.0 LEG 56.0	67k 56.0 LEG 57.0	67k 57.0		HISSING VALUES	SING
ACUT ACUT ACUT	0.00	000.0		330 ••	200	0.00	300	11.11	0.00	0.00	86.89 100.00	0.000	Pro	PRONT OF REPO	0.00 NEPORTS
10	DISTRICT 8	GRAVITY,	356	IOV			Ť	FA	54.3	SIGHA	1.20 KE	KEPOKT	17.	SAMPLES	77
	LEG 47.0	47.0 47.0 46.0	7 7 7 4 8 5 5 6 9 6 9 6 9 6 9 6 9 6 9 6 9 6 9 9 9 9	671 19.0 50.0	50.0 50.0 51.0	67.8 51.0 52.0	61R 52.0 LEQ 53.0	618 53.0 LL0 54.0	54.0 1.E.0 55.0	61R 55.0 LEO 56.0	678 56.0 LEG 57.0	61k 57.0		HISSING	SING
PERED	00000	9.00	0000	0.00	0.000	5. E.	17.65	11.76	35.29	23.53	5.88	100.00	PRUNT	6	0.00 REPORTS

SAMPLES 66	MISSING	0.00 OF REPORTS	SAMPLES 165	MISSING VALUES	2.37 F REPORTS	SAMPLES 223	MISSING VALUES	28 11.16 OF REPORTS	SAMPLES 54	KISSING	10.00 OF REPORTS
66. SAM		PACNT			PKCNT OF			PPCNT	60. SAH		PRCNT
PEFORT 6	618 5•0	100.00	REPORT 169	5.0 5.0	100.00	REFORT 251	5.0	10000	REPORT 6	5.3	100.00
.67 FE	618 4.5 LEO 5.0	100.001	.76 R	678 LE0 5.0	100.00	19.	CTR CEO 5.0	100.001	69.	6TR 4.5 LEO 5.0	100.00
SIGMA	618 LE0 4.5	100.00	SIGHA	618 LEG 4.5	100.00	SIGHA	618 LEG. 4.5	30.0	SIGHA	LEO.	100.00
.7 5.	514 4.0	100.00	٠ <u>.</u>	67.8 8.3.5 4.0	1.82	. 8	2.5.3.	99.55		3.5 4.0	100.00
FAN	3.5 3.5 3.5	100.00	HEAN	3.0 3.5	. 61 96.18	1F AN	3.0 LEG 3.5	00.00	1c An	3.0 3.5 3.5	100.00
•	614 2.5 1.60 3.0	3.03	Ť	618 2.5 1.50 3.0	1.82	Ţ	678 2.5 LEO 3.0	1.35	•	8.5 8.5 8.5 8.5	1.85
	616 2.6 1.50 2.5	0.00		6.5 6.5 7.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8	2.42		7.5 1.0 2.5 5.5 5.5	1.35		8.5 0.51 8.6	7.41
	678 1.5 1.5 2.0	9.06		678 1.5 LEQ 2.0	10.30		8.4.5 2.5.5 3.5.5	4. 34. 96. 66		8.13°	5.56
6/10-1	F. 1.51	87.55	16/13CM	11.5 11.5	12.12 c3.03	16/100PL	1.5 1.5	7.17	46/100PL	£ 433 ;	3.76
NT 6U1,	1.00.1	36.36	41 GUY,	678 (50 1.0	27.83	NT 60%,	6.02 1.05	65 29.15 85.55	NT GUH,	2 . C. 1	29.63
TXISTENT	618 6.50 8.	31	EXISTEN	6.60	37.56 43.03	EXISTENT	9.00	110 49.33 56.50	EXISTENT	5.00 E. S.	23 42.59 51.65
DISTRICT 1	55.	0000	OISTPIC: 2	LEG.	5.5	DISTRICT 3	6.6	7.17	DISTRICT 4	LEO G.G	9.26
010		PE BONT	01.0		PC 41	01.		PCNT ACUR	10		PC THE

. SAMPLES 66	MISSING	0.00 PACINT OF KEPORTS	SAMPLES 162	HISSING	7 4.14 PRCNT OF REPORTS	I. SAMPLES 227	HISSING	24 9.56 PKLNT OF REPORTS	60. SAMPLES 56	4 ISSING VALUES	6.67 PRCNT OF REPORTS
HEFORT 66.	618 • 5u0	196.00	PEPORT 169.	67k .530	100.00	KEFORT 251.	6TK • 500	00000	REPORT 61	. 500°	100.00
.033 HE	618 • 450 LE9 • 500	100.00	.037	618 • 450 LEO • 500	100.00	.045 K	61x .45, LEO	100.00	.020 A	678 . 450 LEQ	100.00
SIGHA	61R • 496 • 456	100.00	SIGMA	. L. C. 3. 4. 5. 0. 6. 4. 5. 0. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	100.00	SIGHA	. LEGO	100.001	SIGMA	678 - 400 - 450	100.00
030 81	350	100.00	.040	.350 LEO	100.00	048 81	. 350 LEG	100.00	.028 51	.350 LTO	100.00
HEAN .	.330 LEG .350	100.001	1E AN	.300 LEU .350	100.00	JE AN	.390 LEG .350	100.00	AEAN	.300 LEQ .350	100.00
ale.	678 .250 Ltu	100.001	¥	678 . 256 LEQ	100.00	Ŧ	67h .250 LEQ .300	100.001	Ŧ	.306	130.00
	9.50	1.52		6.8 .200 L30	100.00		.256	95.66		.200	100.00
FF CEN	677 1159 170	9.65	FECCENT	618 150 150	1.85	FROGNI	678 • 150 LEO • 206	2.66	FFFCENT	.150 LEQ	100.00
WEIGHT F	150	20.69	14513K	618 • 160   150	11.00.00	HEIGHT	67 P	7.03	¥6161	1.13 2.13 3.13 3.13	100.00
surus.	168	1.52	surue,		11.11 91.36	suren.	57. 15. 15. 1.00	21.50	Surfue,	67F 1.55 1.00	3.91
JeTo:	0.000	93.94	10TAL	6.000 1.50	70.63 80.25	3 10TAL	67.6 0.500 1.50	153	4 TOTAL	0.000	91.07
FISTRICT 1	0.00	0000	DISTRICT 2	631.0	.62	DISTRICT	6.00.	0000	DISTRICT	9.000	0.00
2		PE STATE	10		PO NA	10		FRED BC NT	10		PO CE TO SE

7. SAMPLES 61	MISSING	20.78 PRCNT OF REPORTS	2. SAMPLES 2	MISSING	0.0 0.00 PRCNI UF REPORTS	9. SAMPLES 8	MISSING	1 11.11 PECNT OF REFORTS	7. SAMPLES 15	HISSING	2 11.76 PRCNT OF REPORTS
REPURI 77	614 50 • 530	00.00 00.00	REPORT 2	618 60 500 10	0 0.00 10 0.00 10 100.00	REFORT	500 . 500	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PEFORI 17	درن دان دان دان دان دان دان دان دان دان دا	00 000000000000000000000000000000000000
.060	67R • 450 LEO	100.00	200.	6TR • 450 LE3 • 500	130.00	.030	61R • 450 LEQ • 500	100	.023	67x 6450 LEQ . 500	100.00
SIGHA	618 • 496 • 450	10000	SIGMA	618 • 400 • 450	1.0.0.1	SIGMA	61K • 40C LEG • 45C	100.00	SIGHA	6:R • 460 LLG - 450	100.00
640.	.350	100.00	. 045	61K .350 LEG	103.00	829.	618 .350 LEG	100.00	\$ 750.	678 •350 LEG •401	100.03
JE AN	67 R . 3 3 0 L E 0 . 3 5 0	100.00	HEAN	678 .300 LEO .350	100.00	HEAN	618 •300 LEQ •350	100.00	PAN	67F 330 180 835	0.00
*	6.8 .256 LEG	1.64	r	.300 .300	30.00	r	. 250 . EQ	000		.300	0.30
	67.F .230 LEO	13.00 H		61.F 67.0 67.0 .250	100.00		. 230 L. 0 L. 0	100.00		67F - 200 LRO - 250	03.01
FFFCENT	678 -153 LEQ	96.72	FEACENT	.156 LEQ.	109.30	FELCENI	67K .156 LEQ	10.00	FEG C 2 NT	676 • 150 LE 0	100.00
MEIGHT	617 1160 1160	88.52	WCIGH.	616 110 1150	130.00	46I6FT	616 616 616 616 615 615	1,00.01	WEIGHT	.160	100.00
SULFUM,	82.001.	3.20	suru.,	678 .052 LEQ	0.00 100.00	SLLFUF,	.156 LED	100.00	surfue,	67K .150 LFQ	6.67 100.00
TOTAL	67.8 0.000 LEQ	60.33	10TAL	61R 0.003 LEQ	100.00	. TOTAL	0.000 1.60	12.50	LOTAL	678 0.000 LEQ	93.33
DISTRICT 5	000000	0.00	STRICT 6	150	00.00	DISTRICT 7	057	000	DISTRICT 8	1.60	0.00
10		PPEQ PCNT ACUM	316		FCN74 FCN74	10		PCNT	10		PP

1 MEPCAPTEN  610  610  610  611  34, 13  34, 21  34, 21  34, 21  34, 21  34, 21  34, 21  34, 21  34, 21  34, 21  34, 21  36, 32  37, 60  610  610  610  610  610  610  610
1 MEPCAPTEM SULFUF, WEIGHT PETCENT  1 MEPCAPTEM SULFUF, WEIGHT PETCENT  2 WEECAPTAM SULFUF, WEIGHT PETCENT  2 WEECAPTAM SULFUF, WEIGHT PETCENT  3 MEFCAPTAM SULFUF, WEIGHT PETCENT  4 WEPCAPTAM SULFUF, WEIGHT PETCENT  5 5. 25  5 5. 25  5 5. 25  5 5. 25  5 5. 26  5 5. 65  6 5. 33  1 5. 92  2 2 2 2 2 2 2 2 4 7 7 6 6 5 7 6 6 9 6 4 4 4 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 MEPCAPITAN SULFUF, WEIGHT PETCE  610
1 MEDCAFIEN SULFUE,  0.000
1 MEPCAFIEN SULFUE,  0.000
1 MEPCAPTEN  0.0000  13  34. 13  34. 21  34. 21  34. 21  34. 21  34. 21  34. 21  36. 33  48. 21  66. 33  66. 33  66. 33  7. 66  66. 33  7. 67  67. 67

SAMPLES 54	MISSING	23 29.47 PHUNT OF REPORTS	SAMPLES 1	MISSING	50.00 PRONT OF REPORTS	SAMFLES 2	MISSING	77.78 PRCNT OF REPORTS	SAMFLES 10	MISSING	41.16 PHENT OF REPORTS
77.			2.			•			17.		
FORT	. 0010	100.00	FEFCRI	.0010	0.00	CEFORT	.0010	100.00	FEPORT	67 K	100.00
0035 KE	61h 0009 LE0 0010	38.89 100.00	0000	678 .0009 LED	100.001	200000	.0009 LEO .0610	100.001	****	.0009 LE0	3.60
SIGNA . 0	. 00008	0.00	GMA C.J	678 .0038 .0035	00000	SIGMA . 0	.0006 LEG	100.00	SIGMA .0	678 .0038 .EG	109.01
. 1006 SI	.0300 .0300	0.00	IS 010	. 0000 . 00008	000.00	200	0107 LEG 0108	100.00	. 1001 SI		0.00
4E AM J	678 .0006 .0017	0.00	AN .	67 R . 3385 LEG . 3797	0000	1E AN . 0	618 .uc96 .LE0	0.00	SEAN .	674 .0006 LEQ	100.90
#	678 .000.5 L. Q.	3.70 61.11	÷	67R .0005 .LEQ	200	3	61R .0605 LEO	0.000	¥.	679 .1005 .1005	100.001
. V.	4350 150 150 150 150	3.70	r.	4000 071 071 071	9.00	, UF N4	4.50 03.17 03.08	0.00	ENT	4000. 1000. 1000.	0.00
DETENT PER	678 .0003 .E0	5.50	WEIGHT PEGE	614 0003 1160	0.00	Med GHT PEOC	677 0003 163 163	100.00	MEIGHT PEFCERT	610 .0003 LEO	0.00
	.0002 LF0			61.C 0.003 0.003		• 4	5366.	100.001		617 9962 LFG	1999
TAIN SULF	678 -0101 LEQ -0002	11.11 14.31	TEN SULFUX,	.0301 L=9 .0302	0.0	TEN SULF	61 P 00 U1 150	50.00 100.00	TAN SULFUE	67.P .0001 LF 0	20.00
HERCAPTAN	0.0300 LEQ .0001	3.70	NESCAF1414	676 0.0000 LF0	0.00	MERCEPTEN	0.0000	50.00	S MERCAPTAN	67F 3.000 1EG	9 0.00 9 0.00
DISTRICT S	0.0000	0.00	OTSTRICT 6	0.0000	000	DISTRICT 7	3.3330	000	OISTPICT &	0.000.0	0.00
10		AC UN			PO P	16		A CUM	10		PERSONAL DA UN

SAMPLES 66	MISSING VALUES	0.00 PKCNT OF REPORTS	SAMPLES 165	MISSING VALUES	2.37 PALNT OF REPORTS	SAMPLES 245	HISSING	2.39 PRCNT OF REPORTS	SAMPLES 52	HISSING VALUES	13.33 PRCNT UF REPORTS
99	6TR 3.0		169.	3.0	000.	251.	¥ °	3000	•09	3. S	
REPORT	5	100.00	REPORT	5"	100.	REPORT	3.	100	PEFORT	5"	100.00
.22 R	67R 2.9 LEG 3.0	1.52 106.00	.25 R	618 2.9 LEO 3.0	5.45	.24	61R 2.9 LEG 3.0	5.31 100.00	.24	678 2.9 LEG 3.0	5.77
SIGMA	618 2.6 LE0 2.5	15.15 98.46	SIGMA	67R 2.8 LEG 2.9	7.88 94.55	SIGHA	618 2.0 LEG 2.9	11.84 14.65	SIGHA	6TR 2.6 LE0 2.9	5.77
2.6 S.	2.7 LEG 2.8	9.09 83.33	2.6 51	61R 2.7 LEO 2.8	15 9.03 86.67	2.6 S1	61R 2.7 LEG 2.8	3.84 13.88 82.86	2.6 5.	678 2.7 LEO 2.8	15.33 08.46
HEAN	2.6 LEG 2.5	13.64	HEAN	67.8 2.6 LEO 2.7	28 16.37 77.53	HEAN	61R 2.6 LEG 2.7	15.59 68.90	1E AN	678 2.6 LE0 2.7	13.46
3	61R 2.5 LEQ 2.6	25.76 60.61	ž	61k 2.5 LEQ 2.6	25 15.15 60.61	Ĩ	61R 2.5 LEG 2.6	45.51 44.39	¥	LEG 5	15.38 59.62
	67 R 1 C E Q 2 • 5	7.58		67 R 1 C O 2 • 5	8.48 45.45		6. F. C.	25 11. 43 33. 60		4.50	11.54 44.23
v	61K 2.3 LF0	16.61	2	67K 20.3 LED 20.4	25 15.15 36.97	<i>U</i> : (0	618 2.3 1.0	7.76	V)	616 2.3 LEQ 2.4	15.3¢ 32.69
SSURE, LB	2.2 LEO 2.3	9. rs 16.67	SSUKE, LB	2.5	15 9.05 21.62	J. JJn S.	67 F 2 • 2 1 F G 2 • 3	14.60	ESSURF, LB	67. 2.3	5.77
VAFOR PPI SSI	2.2 2.2	6.06	EID VAFON FRESSURE,L	5.5 1.5 2.5	14. 8.48 12.73	VAFOR FOR	518 2.1 150 2.2	5.31 10.20	VAFOR PRE	67 K 2.1 LFQ 2.2	7.69
FEID	2.1 2.1	1.52	10134	67.8 2.0 1.5.0 2.1	3.64	25 IB	CTR 2.0 LEG 2.1	4.08 4.90	0130	67.5 2.0 LEQ 2.1	2000
DISTRICT 1	2.0	00000	DISTRICT 2	2.0	. 61	UISTRICT 3	2.0	288	STRICT 4	LEG 2.0	00.00
918		FE ES FC UM	015		PC NT AC UM	018		FE EN PC NT AC UM	018		FLES FCNT ACUM

DISTRICT	ın	NEID VI	AFOR PRE	VAFOR PRESSURF, LES	5		ž	HEAN	2.6 SI	SIGNA	.24 FE	REFORT	77. SAM	SAMPLES
2.0		618 2.0 2.0 2.1	67 F 2.5 2.5	61h 2•2 LEG 2•3	676 2.3 150 2.4	2.5 2.5 5.5	61k 2.5 LEG 2.5	618 2.6 LE0 2.7	67.7 LEG 2.0	618 2.5 2.9	618 2.9 LE0 3.0	3.0		MASSIN
1.32		5.26	2.63	9.21 18.42	11.84 30.26	14.47	17.11	14.47	9.21	13.16 98.66	1.32	100.00	PECNT OF	1.30 1.30 F REPORTS
DISTRICT	9	610	VAFOF FFE	FESSUFE, LP	()		₹ 3	HEAN	2.7 SI	SIGMA	•14 RE	REPORT	Z. SAM	SAMPLES
LE0 . 2	-	2.5 2.9 2.1	678 2.1 2.2 2.2	671. LF0 2.3	618 2.3 LEU 2.4	616 2.5 2.5	61R 2.5 LEQ 2.6	67.k 2.6 LE3 2.7	618 2.7 LEO 2.0	618 2.8 LE0 2.9	61R 2.9 LEG 3.0	61k 3.0		MISSING
0.00		00.00	0.00	0.00	0.00	0.0000000000000000000000000000000000000	56.00	00.00	50.00 100.00	100.00	100.00	100.00	PKCNT OF	0.0 F REPORTS
DISTRICT	~	1 013	AFOR FEE	FEID VAFOR FRESSURFILE	b,		÷	4E AN	2.6 SI	SIGMA	.19 PE	PEPORT	9. SAH	SAMFLES
LE0 2.0		67x 2.0 2.1	518 150 2.2	671 2.2 LEO 2.3	678 2.3 2.4	678 2.4 150 2.5	67R 2.5 LEO 2.6	67 8 2.6 LEQ 2.7	67R 2.7 LEO 2.8	618 2.6 1.60 2.9	618 2.9 LEQ 3.0	3.0 3.0		MISSING VALUES
0.00		00.00	11.11	9.0° 11.11	11.11	22.22	22.22	33.33	22.22 100.00	100.00	0.00	100.00	PRCNT OF	0.00
DISTRICT	a.	REID V	V. F.O 07.4	91,35025376	S		£	AEAN	2.5	SIGMA	.17 8	REFORT	17. SAM	SAMPLES
2.0		67.5 2.0 1.6.0 2.1	5.5	2.5.5	678 164 2.4	6.5 1.0 2.5 5.5	67R 2.5 Led 2.6	678 2.6 LEG 2.7	618 2.7 LEG 2.8	61 2 6 6 2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	61k 2.9 LE0 3.0	3.0 3.0		MISSING VAL UES
0.00		9.00	7.14	14.26	21.43	14.29	21.43	14.29	7.14	100.00	100.00	100.00	PRCNT OF	17.65 F REPORTS

Table XIV. Heat of Combustion

1

. SAMPLES 61	MISSING	16 20.78 PAUNT OF NEPORTS	2. SAMPLES 2	HISSING	PRENT OF REPORTS	9. SAMFLES 8	HISSING	11.11 PHONT OF REPORTS	. SAMFLES 15 MISSING VALUES		21.76 PHONT OF REPORTS
REPORT 77	43.9	0.00	K F PORT	43.9	0.00.001	REFORT	67A 43.9	0.00	REPURT 17		0.00
.1 KE	67.8 43.0 LEQ 43.9	100.001	.1 66	678 43.8 43.9	0.000	34 0•	43.8 43.0	100.00	0 + 54 X & 6 * 6 * 6 * 6 * 6 * 6 * 6 * 6 * 6 * 6	43.9	100.00
SIGHA	618 43.7 43.8	100.001	SIGHA	618 43.7 43.8	100.00	SIGMA	678 43.7 43.6	100.00	SIGMA 61R 43.7	43.8	100.001
43.4 SI	67.8.6 43.6 43.7	6.56 100.00	13 9.27	67.8 43.7	100.00	43.6 53	67.8 43.6 LEQ 43.7	100.00	43.6 SI	43.7	26.67
HEAN	618 43.5 43.6	13.11 93.44	A	678 43.5 43.6	0.00	AAN	618 43.5 LEQ 43.0	00.0	1EAN 6TR 43.5	43.6	73.33
46	618 43.4 43.5	19.67	4	617 4 680 4 680 4 680	000	Ť	63.8 43.6 43.5	0.0	2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	LF0 43.5	000
MJ/KG	6. F 4.3.3 4.3.4	29.51 60.66	MJ/KG	0.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10	00.00	MJ/KG	67.5 43.5 43.4	0.00	MJ/KG GTF 43.3	LE0 43.4	0000
6	67.8 43.2 Lf 9 43.3	21.31 31.15	EM COLIN	67 c 43.2 43.3	0.00		43.3 43.3	0.00.0	2.	LE0 43.3	
ביורא נכלני	67 ° 43.1 LF 6 43.2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MOI	67 E 4 3 . 2 4 3 . 2		BUSTION (CALCO)	675 43.1 650 43.2	335		LE0	30.0
F COMPUS.	679 43.0	0.00	OF CUMPUST	43.1	9.00	0F COP3US	67.6 4.73.0 4.83.1	0.0	OF COMPUS GTP 43.1	1.50 4.3.1	0.00
P.E.A.T. U	6.53 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0	0.00	4	42.9 1.50.9	00.00	HE A T	677 42.9 (ED)	0.00	H. A.	LE0 43.0	00.00
STSTATET 5	42.9	0000	01510101 6	42.9	0.00	DISTRICT 7	42.9	0.00	ISTRICT 8	42.9	0.00
5		PC PT ES	10		PC NT AC UM	5		FC NT FC NT ALUM	16		PC NT

SAMPLES 66	MISSING	0.00 PRCNT OF REPORTS	SAMPLES 167	MISSING	2 1.18 PRCHT OF REPORTS	SAMPLES 230	MADSING	8.37 PRCNT OF REPORTS	SAMPLES 60	HISSING	PRCNT OF REPORTS
. 99 D	61k 25.0	00000	1 169.	67k 25.0	0000	81 251.	6TK 25.0	00000	RT 60.	61k 25.0	000
2.43 REFORT	67R 22.5 LEO 25.0	0.00 106.00 10	4.15 FLPORT	678 22.5 LED 25.0	100.001	2.74 FEFORT	678 22.5 LEG 25.0	0.00	3.40 HEFORT	6TR 22.5 LEQ 25.0	100.00
GMA	67R 20.0 LEO 22.5	0.000	0 H	67 K 20.0 LEG 22.5	100.001	SIGHA	6TR 20.0 LEO 22.5	100.00	SIGMA	218 20.0 22.5	100.00
11.9 SI	618 17.5 LE0 20.1	1.52	8 8	17.5 17.5 LEG 20.0	3.59 95.21	11.8 SI	17.5 17.5 12.0	2.61	10.5 SI	17.5 12.5 12.0	100.00
	67.R 15.u LEG 17.5	99.09	NA L	6TR 15.0 LLC 17.5	7.19 91.62	1LAN 1	67R 15.0 LED 17.5	28 12.17 56.96	1E AN	15.0 15.0 17.5	16.67 100.01
HEAN	678 16.5 160 15.0	26.79 89.39	.46	678 12.5 160 15.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4.	674 175.5 162.5	18.74	*	678 12.5 LEQ 15.6	4 08 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
	61R 10.0 13.0	40.91 60.61	-	10001	27 16.17 75.45	Ę	12 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	32.17	Ļ.	618 118 128 128	14.33
NBUNBA B	2.2.5 2.2.5 3.2.5	19.12	F FERCENT	61K 7.5 1.60	55.93 59.25	Pt PERC	679 7.5 160 10.0	33.91	E PERCE	67.4 10.0	43.33
-, VULUE	5.5 0.5.2 7.5	# K IV	0, W.LU!	7.5	23.35	ייי, יכנטי	5.0 1.0 1.5 7.5	0.00.0	T, VULUE	3.6	0 N N N N N N N N N N N N N N N N N N N
C COLUEN	£ 25.	0.00	C CONTEN	15 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	3.00	37.00 3		1.03	TC CONTE	2.5	00.0
4-06-7	6.000	9300	7 TA 40 34	67 p 9 • 9 2 • 5	0000	450***** CO	678 2.50 2.53	00000	T-10-0-4	6.05	0000
STAICT 1	9.	00000	PISTRICT 2	0.0	0.00	DISTRICT 3	0.0	0.00	DISTOICT 4	0.0	0.00
0151		P. F. P. AC UK	SIG		FF FO FC AT	018		PC FT PC FT PC FT	018		PP EN AT

Table XV. Aromatic Content

77. SAMPLES 63	MISSING VALUES	14 18.18 PACNT OF REPORTS	2. SAMFLES 2	MISSING	DO DO DE BENETS	9. SAMPLES 9	MISSING	DECNT OF REPORTS	17. SAMPLES 17	MISSING VALUES	0 0 0 0
REFORT	61K 25.0	100.00	KEFORT	61R 25.0	100.00	PEPORT	61R 25.0	100.00	HEPORT	61h 25.0	0.00
2.28 K	6TR 22.5 LEO 25.0	100.00	.76 K	61k 22.5 LE0 25.0	100.001	2.13 PI	6TR 22.5 LEQ 25.0	100.00	1.37	618 22.5 LEO 25.0	30
SIGHA	6TR 20.0 LE0 22.5	100.00	SIGHA	6TR 20.6 LE0 22.5	100.00	SIGHA	618 26.6 LEO 22.5	100.00	SIGHA	6TR 20.6 LEO 22.5	3
12.7 5	67 R 17.5 LEG 20.0	100.00	14.4 51	61R 17.5 LEO 20.0	160.00	10.5 SI	618 17.5 LEG 23.0	100.00	12.3 S.	61R 17.5 LEO 20.0	6
4E AN	678 15.0 LEG 17.5	12.70 100.00	1EAN	673 15.0 LEG 17.5	100.00	1E AN	678 15.0 17.5	100.00	HEAN	61R 15.0 LEO 17.5	00
Ŧ	678 12.5 160 15.0	35.68	Ŧ	618 12.5 LEG 15.0	100.00		67R 12.5 LEG 15.0	100.00	Ŧ	61P 12.5 LEG 15.0	0 0
ENT.	678 10.0 160 12.5	30.16	'n	678 10.0 12.5	0.00	1 Z.	10.0 12.0 12.5	68.69 100.00	7	150 150 17.50	L 4
THE PERCENT	67.8 7.5 4.50	17.46	JME PERCENT	67.5 7.5 150	00.00	INE PERCENT	51 R 7 • 5 10 • 0	11.11	JME PENCENT	67K 7.5 LEO 10.0	22
ENT, VOLUME	67.5 LEG 7.5	• • • • • • • • • • • • • • • • • • • •	NT, VOLUME	675 5.0 LEO 7.5		NT, VOLUPE	61° 5.0 LEQ 7.5	0.06 11.11	"IT, VOLUME	516 0.50 1.50 2.5	-6
AROMATIC CONTENT	67.8 2.5 1.60 5.0	00000	AROMATIC CONTENT	678 62.5 65.0	0.000	AROHATIC CONTENT	2.5 5.5 5.6	11.11	AROMATIC CONTENT	678 2.5 LFQ 5.1	
	678 0.0 150 2.5	•••		678 13.0 12.5	0000		618 6.0 2.5	00.0		678 0.0 2.5 2.5	3 3
DISTRICT 5	0.0		DISTRICT 6	LE0	000	DISTRICT 7	LEO	0000	DISTRICT 8	0.0	000
010		PCNT ACUM	01:		PCNT ACUM	10		FRED FCNT ACUM	01		97.60

99	MISSING VALUES	0.00 REPORTS	106	MISSING VALUES	1.78 KEFORTS	228	HISSING	23 9.16 REPORTS	55	MISSING VAL UES	8.33 REPORTS
SAMPLES	A L		SAMPLES	Z A	or K	SAMPLES	T a	<b>9</b>	SAMPLES	2 4	
66. 54!		PRCNT OF	•		PRCNI	251. SA		PRONT	60. SA		PRCNT OF
REFORT 6	5. e	100.00	9EF087 16	5.0	100.00	REFORT 25	5.0 5.0	100.00	REFORT 6	67h 5.0	100.00
.31 RE	67x LE0 5.0	100.00	30 04.	618 4.5 LEG	100.00	3.	618 LE0 5.0	100.00	42.	67R 4.5 LED 5.0	100.00
SIGHA	61 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	100.00	SIGHA	1,000 t	100.001	SLGHA	6.5 FES.	100.00	SIGHA	67.8 LE0.1	100.00
.9	3.5 3.5 4.0	100.00	6	64.5 4.0 4.0	100.001	•	6.58 LEG 3.5	103.03	9.	67x 8.5 6.50	100.00
4E AN	3.3 3.3 1.5 7.5	100.00	NASE	616 3.0 1.56 3.5	100.60	4E AN	3.0 150 3.5	100.00	HE AN	3.1 3.5 3.5	0.30
Ť	618 2.5 6.5 3.6	1,00.00	Ī	677 2.5 160 3.0	30.0	•	678 2.5 110 3.0	99.56	τ	61R 2.5 LEQ 3.0	170.00
	61 F 2 • 0 2 • 5	103.00		67.F 2.0 1.F.G 2.5	2.41		2.5 2.5	98.62		618 2.0 150 2.5	0.00
1430.634	618 1.5 1.5 2.0	3.03	PERCFNI	218 20 20 20 20 20 20 20 20 20 20 20 20 20	5.02 36.99	FEPOLNT	618 1.5 2.9	3.07	PERCENT	11.5 1.5 2.0	0.00
, vot une	2.5.	16.67 36.97	. VOLUME	67° 1.0 1.5	15.25 90.96	, VOLLYE	1.5	6.53	, VOLUME	1.0 LF0 1.5	1.82
CONT. NT	? . G.	66.67	CONTENT	1.05 1.05 1.05	43.98 71.69	CONTENT	61.0 LEQ 1.0	136 53.65 88.16	CONTEN	67.8 LEGO 1.1	32 56.10 98.18
CLEFIN	6.0 0.0 0.1	13.64	OLEFIN	61. 6.0 6.0	26.51 27.71	OLEFIN CON	67.6 6.0 LEQ	27.63 26.51	OLEFIN	0.0 0.0 2.5 5.	36.36
UTSTRICT 1	0.0	00000	DISTRICT 2	0.0	1.20	DISTRICT 3	6.9	0. 00 0. 00	DISTRICT 4	LE0 6.0	3.64
STU		PP PP AL UM	015		PO NT	018		FF ED FC UT	018		PO ED

010	DISTRICT 9	S OLEFIN	CO.472NT	, voi the	De. CE !!		E	HEAN	18 6.	SIGMA	.32 FE	FLFORI		SAMPLES	62
	0.0	9.00 0.00 0.00 0.00	1.3	64. 1.5 1.5	618 1.5 1.5 2.0	12.5	618 2.5 164 3.0	67.8.3 8.5 8.5	3.5 1.50 4.00	61R 4.6 4.5	61R 1.5 1.5 5.6	5.0		MISSIN	S
FOR TOTAL	0.00	20.97	64.52	55.55 1.55.55	4.84	100.00	100.00	100.00	100.00	100.00	100.00	100.00	PRCNI	19.48 NT OF REPORTS	84. E
16	DISTRICT	6 OLEFIN	CONTENT	, VOLUME	- 0EFCELL		Ē	MEAN	3.	SIGHA	0.00 Rt	REFORT		SAMFLES	
	9.0	0.00	2.0.1 2.0.1	£ + 5 +	612 1.5 LEO	6.5 6.5 6.5 8.5 8.5	2.5 LF0	3.5 3.5 3.5	8.5.7.4 8.5.5.4	618 LES 4.5	618 LE0 5.0	5.0		HISSI VALUES	SING
FLED FONT BC UM	0.00	100.00	0.00.001	 	100.00	00 · 00 t	100.001	100.00	16.00	3.0.00	1.0.00	1,00.00	PRO	50.0 PRINT OF REPORT	50.00 PORTS
010	DISTRICT	7 OLEFIN	OLEFTN CUITENT	, ימוני	10 TO 13 .		•	1E AN	.5	SIGFA	.2u RE	REFORT	•	SAMFLES	σ
	95	6.01	1.5.5	677 11.3 11.5	678 11.5 1.5 2.0	2022	61k 2.5 LT0 3.0	678 3.5	2.5.5 4.0014	FE 4 2	67k 6.5 5.0	61x 5.0		MISSING	9 N S
40 04 CT 140	00000	8 8 8 8 8 8 7 5	11.11	1.00.00	106.00	100.00	100.00	100.001	160.00	100.00	100.00	160.00	PRCN	OF REP	00 8.00 S T S
0.10	DISTRICT	e olefir con	CONTING	, 401.04	F. 50.63 T		•	1E AN	5.	SIGMA	.47	FEFORT	17.	SAMPLES	1,
	9.0	675 6.00 6.00 6.00	F. 53.	11.5 LEG 1.5	678 11.5 1.50 2.0	2.0.5	2.5 3.0 5.5 5.5	3.0 1.0 3.5 3.5	8 8 9 4 6 9 4 6 9 4 6 9 9 9 9 9 9 9 9 9 9 9	X + 1 + 2 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3	618 4.5 LEQ 5.0	5.6 5.6		LISSING	5 KING
FF FO FC NT	00.00	13 76.47 76.47	11.76	11.76	0.00	0.001	3.30	100.00	100.00	100.001	0.000	0.00	PACNI	NT OF REPORTS	8 T S

SAMPLES 62	MISSING	6.16 PRCNT OF REPORTS	SAMPLES 142	VALUES	27 15.96 PRCNT OF REPORTS	SAMPLES 223	MISSING	28 11.16 PHCNT OF REPORTS	SAMPLES 59	MISSING	1.67
.99			169.			251.			.09		
PFPORT	67k 15.10	100.00	PLPORT 3	15.10	100.00	RE PORT	6TR 15.10	100.00	PEFORT	61R 15.10	00.00
.19	61K 14.95 LEO 15.10	100.00	. 27 P	14.95 LEQ 15.13	100.00	.17	6TR 14.95 LE0 15.10	100.00	.22	678 14.95 LEQ 15.10	0000
SIGHA	618 14.86 LE0 14.95	100.00	SIGHA	14.80 LEG 14.95	100.00	SIGHA	618 LE0 14.95	100.00	SIGMA	6TR 14.86 LEG 14.95	0.00
14.45 SI	618 14.05 LEQ 14.83	4.84	2, 4, 5	14.65 LEO 14.80	20.42	14.32 SI	67K 14.85 1.80	3.14	. 40 SI	6TR 14.65 160	.784
1EAN 14	618 14.50 LEQ 14.65	32 51.61 95.16	HE AN 14	14.50	40.85 79.58	HEAN 14	618 14.50 160 14.65	6.73 96.86	1EAN 1	678 14.50 LEG 14.65	36.90
46	672 14.35 14.50	16.13 43.55		14.35	26. 25. 25. 25.	¥	14.35 LF0 14.50	90.36	#	678 14.35 LEQ 14.50	15.25
	67F 14.20 150	14.52	<u>.</u>	14.20	5.63		14.20	26.70 49.75		67 F 14.20 14.35	10.95
CALCON	61k 14.65 Lt.0	6.45 12.90	(CALCD)	14.05	10.56 23.94	(נארנים)	678 14.05 Lt 0	12.56 21.08	(07740)	616 14.05 16.0	16.95
7	13.90 18.00 14.05	000	- 67.	13.90 LEG 14.35	7.75 13.3	45	13.07 160 14.05	\$ 2.0 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5		67F 13.0c LEO 14.05	5.0.8
HYPPOGE	67.6 13.75 11.9	0.00	HYUROGE 610	13.75 LEQ 13.90	5.52	190%CY4	678 13.75 Le 0 13.90	2.25	HYDROGEN	677 13.75 15.0 13.90	0.00
1404	618 13.63 LEQ 13.75	. 00 .	£ 4 5	13.60 LEQ 13.75	2.11.3	PERCHI	678 13.63 LEQ 13.75	000	FERCAL	13.60 LE0 13.75	000.0
1 1		0.00	5	0 9	000	5		900	61 4	0.9	0.00
DISTRICT	13.60		DISTRICT	13.60		DISTRICT	13.60	000	DISTRICT	13.60	
10		FPED	10		FP EQ FC NT AC UM	10		PC NT	10		FP ES

. SAMPLES 59	MISSING VALUES	23.38 PACNT OF REPORTS	2. SAMPLES 2	MISSING	0.00 PFCNT OF REPORTS	9. SAMPLES 9	MISSING	DECNT OF REPORTS	17. SAMPLES 16	MISSING	5.86 PRCNT OF REPORTS
SEPURT 77	678 195 15•10 10	0 0 0 000	REPORT 2	6 GTK 95 15.10 0	00.000000000000000000000000000000000000	REFORT	95 15.10	00.000000000000000000000000000000000000	FEPORT	F GTK 95 15.10	00.00
SIGMA .22	GTR GTR 14.80 14.95 LEG LEG 14.95 15.10	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	SIGMA .13	GTR GTR 14.30 14.95 LEG LEG 14.95 15.10	0.00 0.001	SIGNA .05	678 678 14.60 14.95 LEG LEG 14.95 15.10	0.00	SIGHA .07	GTR GTR 14.36 14.95 LEG LEG 14.95 15.10	100.00 100.001
14.10 SI	678 14.65 LEQ 5 14.80	0.00	14.34 SI	678 1 14.65 LEG 5 14.80	0.00	14.56 SI	678 14.65 LEQ 14.83	11.11	14.40 SI	14.65 14.89	100.00
4E AN	GTR GTR 14.35 14.50 LEQ LEQ 14.50 14.65	16.95 94.92 100.00	JEAN	6TR 6TR 4.35 14.50 LEQ LEQ 4.50 14.65	00.00	1c An	GTR GTR 14.35 14.50 LFO LEO 14.50 14.65	0.00	1E AN	678 678 (4.35 14.50 LL0 LE0 (4.56 14.65	01.25 0.00
	GTF 6 14.20 14 LEG L 14.35 14	30.51 16. 77.97 94		6-r 14-29 14- 11-0 14- 14-35 14-	59.00 50.00 50.00 150.00		61F 67			6.6 14.20 14.20 14.35	16.75 01. 18.75 100
(CALCO)	61R 14.05 LEQ 14.20	20.34	ונעררט	6TF 14.05 LEJ 14.20	,,,, ,,,	(CALCO)	618 14.05 14.20	000	(CALCO)	67.R 14.05 LEQ 14.23	
	5 13.90 LEO 14.65	1 8.47 4 27.12		678 5 13.90 LEG 3 14.05	9.00		5 13.90 LEG 3 14.05	90.0		5 13.9¢	90.0
PEPCINT HYDPUGEN	618 6u 13.75 0 L=0 75 13.90	0.00 18.64 0.00 18.64	PENCNI HYDROGEM	60 13.75 0 1.60 75 13.90	000000000000000000000000000000000000000	PERCNT HYDRUGER	60 13.75 0 LEO 75 13.93	9.00	PERCNT HYDROGEN	60 13.75 0 L.0 75 13.90	0.00
2	6TR 13.6u 13.60 13.75	0.00	٠	67K 17.60 12.60 13.75	0.00	~	67F 13.60 15.60 13.60 13.75	0.00	DISTRICT & PE	CTR 13.60 13.60 13.75	.0000
DISTRICT	-	AC UT	DISTRICT	-	FR EQ FCNT ACUM	DISTRICT	-	AC UH	TSTO	•	PE PUNT

55 66	MISSING VALUES	0.00 REPORTS	ES 165	VAL UES	2.37 REPORTS	ES 195	MISSING	22.31 REPORTS	ES 58	MISSING	3.33 8.6 PORTS
SAMPLES		PRONT OF	SAMPLES		PRCNT OF	SAMFLES		P	SAMPLES		PRCNT OF
.99		Pro			PRC	:		PACNT	• • •		9
REPORT 6	38.0	100.00	REPORT 169.	36.0	1000.000	RFFORT 251.	50°	100.00	REFORT 6	318 36.0	00.00
3.23 KG	6TR 36.0 LEG 38.0	100.00	3.16 RE	36.0	100.001	3.21 PF	36.0 LEO 36.0	100.00	3.23 66	618 36.0 160 36.0	5.17
SEGMA	34. 34. 16.0	100.00	SIGHA	34.0 LEO 36.0	1.82	SIGHA	34.0 LEO 36.6	100.30	SIGHA	34.0 140 36.6	3.45
27.4 5.	32.3 34.3	1.52	26.3 S. S.	32.1 1.50 34.0	2.42	S 6.75	32.0	6.67	28.1 S	32.0 LEO 34.0	1.72
TE AN	674 30.6 LEO 32.0	15.15	E AN	30.0 32.0	29.70 95.76	AA	30.0 LE0 32.0	25 12.82 98.72	HEAN	30.0 1.60 32.0	15.52
ž	61R 28.6 150 30.0	33,33	9	30.0	39 23.64	Ť	22.0 20.0 30.0	6.67	*	67R 26.0 LEO 39.0	16.97
	678 26.0 150 24.0	10.61	5	28.0	13.33		25.0 27.0 27.0	35.36 69.23		25. L. O. 28. g	22.41
	618 24.0 LEQ 26.0	39.39	45	24.6 LFQ 26.0	12. 73 29.09		24.5 26.9 26.9	22.56		24.0 16.0 26.1	27.59
	67° 22.0 LEO 24.0	25.76	÷	22.0	11. 52 16. 16		22.0 LFG 24.0	11.26		676 22.0 LEC 24.0	5.17
FOINT	20.0 20.0 1.54 22.0	3.03	THIDA	23.0	. 35	FUINT	674 21.0 LED 22.0	1.54	TVIOS	61R 22.0 22.0	0.00
SHOKE	18.3	1.52	SHOKE TTP	29.0	9.00.0	SAOKS	11.0 150 20.0	90000	SHOKE	118.0 25.0	000
DISTRICT 1	16.0	0.00	DISTRICT 2	19.0	0.00	DISTRICT 3	18.0	00.00	DISTRICT 4	18.0	000
018		PT P	018		20 M	010		PE ED AC UM	013		PCET

SAMPLES 62	MISSING	15 19.48 PRCNT OF REPORTS	SAMPLES 2	MISSING	0.00 PACNT OF REPORTS	SAMPLES 4	MISSING	55.56 PECNT OF REPORTS	SAMFLES 17	HISSING VALUES	PALNT OF REPORTS
11	x :	999	\$	36.0	0000	<i>*</i>	æ •	000	17	36.0	300
EPORT	# 5 W	103.00	REPORT	28	100	PEPORT	36.	100	REPORT	38	110.00
3.04 FEFORT	36.0	1.61	17.	36.0 LE0 33.0	100.00	35.	36.0 LED 38.0	100.00	***	36.0 Lr0	100.00
SIGNA	36.0 36.0 36.0	96.39	SIGHA	34.0 14.0 16.0 36.0	100.001	SIGMA	618 34.0 LEO 36.6	100.00	SIGHA	34.0	30.00
24.7 51	3 2 3 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	99.34	25.5	678 32.0 LEG 34.0	00.00	27.0 SI	32.0 32.0 54.0	1.00.00	\$ 8.53	67 K 32.0 15.0 34.0	130.02
HE AN	30.00 100.00 32.0	98.39	HEAN	67 R 30.0	00.00	1E AN	61R 30.0 LEO 32.0	0.00	4E AN	618 31.3 150 32.3	0.00
ŧ	6:R 28.0 110 30.0	96.39	τ	61x 28.0 30.0	00.00	•	67k 28.6 LFQ 37.0	10.00	7	676 28.0 150 36.0	10.00
	25.0 LEO 28.0	14.52		26.0	190.00		25.0 150 28.0	100.00		2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	6.60
	24.7 1.60 26.0	27.42		67 K 24.3 LFQ 26.9	100.00		67P 24.3 LFQ 26.0	0.00		24.1 26.0 26.0	143.30
	25.0 LEC 24.6	27.42		67+ 22-0 160 24-0	33		22.0 LED 24.0	0.00		676 22.0 1.50 24.6	300
POINT	20. 20. 22.0	19.35	LATIO	67.6 23.6 45.3 22.6	9.00	POINT	67 R 20.0 150	0.000	POINT	67 8 20.1 LED 22.0	9.00
SHOKE	18.0	1.61	SACKE	14.0 15.0 15.0	000.0	SHOKE	15.0 15.0 20.3	0000	SHOKE	25.0	90000
DISTRICT 5	16.0		DISTRICT 6	14.0	0000	STRICT 7	LE0 18.9	0.00	DISTRICT 8	18.0	0.00
018		PC N	07.5		PC NT	0.19		FC NT	916		FF FG FC FT AC UM

18.12 22.73 37.90 6.00 18.12 22.73 37.90 6.00 39.39 62.12 100.00 100.00 6TR GTR GTR GTR 94. GTR GTR 94. GTR 97. 100. 16.77 20.96 8.96 0.00 70.06 91.02 100.00 100.00 6TR GTR 94. GTR 94. GTR 97. 100.00	18.12 22.73 37.80 6.00 18.12 22.73 37.80 6.00 39.39 62.12 100.00 100.00 6TR 6TR 6TR 6TR 6TR 16.77 20.96 8.96 0.70 70.06 91.02 100.60 100.00 70.06 91.02 100.60 100.00 19.11 12.60 160.00 77.24 89.84 100.00 100.00	112 22,73 37,80 110.00 11 12.00 11 12.00 11 12.00 11 12.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.00 11 12.00 11 10.0
59.59 52.12 100.00 100.	59.59 SIGHA 7.6 REFORT GTR GTR GTR GTR GTR GTR GTR GTR GTR G	67. SIGHA 7.6 REFORT 169.  67. GTR GTR GTR GTR  91. E9. LE0.  16.77 20.96 8.90 0.00  70.06 91.02 100.00 100.00  67. GTR GTR  91. 94. 97. 100.  19.11 12.60 100.00 100.00  77.24 89.94 100.00 100.00  77.24 89.94 100.00 100.00  68. SIGHA 7.6 REFORT 60.  67. GTR GTR  69. 97. 100.
69. SIGHA 7.6 REF 6TK GTR GTR 91. 94. 160. 94. 97. 100. 16.77 20.96 8.95 70.06 91.02 100.00 3 70.06 91.02 100.00 3 69. SIGHA 6.9 REF 67R GTR 94. 97. 100. 19.11 12.66 10.16	69. SIGHA 7.6 REF GTR GTR GTR 91. 94. 100.00 3 16.77 20.96 8.96 15 70.06 91.02 100.00 3 69. SIGHA 6.9 REF GTR GTR GTR 91. 67 12.66 100.16 94. 97. 100.00 3 19.11 12.66 100.16 77.24 89.84 100.00 3	69. SIGHA 7.6 REF  GTR GTR GTR  91. LEG LEG  16.72 20.35 8.35  70.05 91.02 100.00 3  70.05 91.02 100.00 3  19.11 12.66 10.16  77.24 89.84 100.00 3  GTR GTR  GTR  GTR  GTR  GTR  GTR  GTR
GTR GTR GTR 91. 94. 97. 16.77 20.96 8.96 70.06 91.02 100.00 3 69. SIGHA 6.9 REF GTR GTR GTR 91. 94. 57. LEO LEO LEO 94. 97. 100.00 3	GTR GTR GTR GTR 94. 97. LEG 94. 97. 100. 94. 100. 97. 100	GTR GTR GTR GTR 94. 97. 160. 94. 97. 160. 94. 97. 160. 97.
28 20.35 0.36 70.05 91.02 100.00 100.00 70.05 91.02 100.00 100.00 89. SIGHA 6.9 REFORT GTR GTR GTR 31. 94. 57. 100. 19.11 12.60 10.16 0.00 77.24 89.84 100.00 100.00	28 26.35 8.35 0.00 73.05 91.02 100.60 100.00 89. SIGMA 6.9 REFORT GTR GTR GTR GTR 31. LEG LEG 97. 100. 19.11 12.60 10.16 0.00 77.24 89.84 100.00 100.00	28 20.35 0.36 73.05 91.02 100.00 100.00 73.05 91.02 100.00 100.00 99. SIGHA 6.9 REFORT 6TR 94. 97. 100. 19.11 12.60 10.16 0.00 77.24 89.84 100.00 100.00 77.24 89.84 100.00 100.00 6TR GTR GTR 6TR GTR GTR 61. 160.00 94. 97. 100.
69. SIGMA 6.9 REFURI 6TR 6TR 6TR 6TR 91. 94. 37. 100. LEG LEG LEG 97. 100.	69. SIGMA 6.9 REFORT  GTR GTR GTR GTR  91. 94. 57. 100.  19.47 31 2.60 10.16 0.00  77.24 89.84 100.00 100.00	69. SIGHA 6.9 REFORT  GTR GTR GTR GTR  91. 94. 97. 100.  94. 97. 100.  19.11 12.60 10.16 0.00  77.24 89.84 100.00 100.00  68. SIGHA 7.6 REFORT  GTR GTR GTR  GTR GTR GTR  GTR GTR  94. 97. 100.  94. 97. 100.
GTR GTR GTR 31. 94. 57. LEG LEG 34. 97. 100. 47. 31 12.66 10.16 77.24 89.84 100.00 1	GTR GTR GTR GTR 91. 100. 100. 100. 100. 100. 100. 100.	GTR GTR GTR GTR  91. 94. 57. 100.  LEG LEG LEG  19.11 12.66 10.16 0.00  77.24 89.84 100.00 100.00  GTR GTR GTR GTR  GTR GTR GTR  94. 97. 100.
13.11 12.66 10.16 77.24 89.84 100.00 1	47 31 35 0.00 19.11 12.66 10.16 0.00 77.24 89.84 100.00 100.00	13.11 12.66 10.16 0.00 77.24 89.84 100.00 100.00 68. SIGMA 7.6 REFORT 6TR GTR GTR GTR 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00
	SLGMA 7.6 REFORT	68. SIGMA 7.6 REFORT GTR GTR GTR 91. 94. 97. 100. 94. 97. 100.

FC UM

Table XIX. Water Separation Index, Modified

FO ST

FE ES

PC NT

77. SAMPLES 75	MISSING	2.60 PRCNT OF REPORTS	2. SAMPLES 2	HISSING	0 0.00 PRCNT OF REPORTS	9. SAMPLES 9	MISSING VALUES	0 0 0 PACNT OF REPORTS	17. SAMPLES 17	HISSING VALUES	PRCNT OF REPORTS
REPORT	100.	100.00	REPORT	67R 100.	100.00	KEPORT	100°	0.00 1.00.00	KEP ORT	100.	100.00
5.6	67R 97. LEG 100.	13.33	1.4	61k 97. LEG 100.	100.00	6.4	61P 97. LEO 100.	11.11	6.5	618 97. LEQ 100.	11.76
SIGHA	94. 1E0 97.	21.33 86.67	SIGHA	618 94. 160	100.00	SIGHA	618 94.	0.000	SIGMA	678 24. 1E0	3 17.65 88.24
92 <b>.</b> SI	GTR 91. LE0	24.00 65.33	o6. SI	6TR 91. LEG 94.	100.00	87. SI	678 131. 94.	0.00	o7. SI	67 8 6 9 4 9 4 9 4 9 4 9 4	17.65
HEAN	67R 88. LEQ	16.00 41.33	4E AN	618 88. LEG 91.	130.00	HEAN	618 88. 91.	22.22 88.89	1E AN	LE 3 .	5.84 52.94
Ŧ	618 85. LEG	13.33	Ŧ	618 85.	50.00	Ŧ	618 88	11.11	Ŧ	617 659	0.000
9	6.6 52. 1E0	2.67	G	67.F 52. 150	50.00	c	1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	44.	c	67 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	11.76 47.06
HODIFIED	61P 79. LEQ 82.	6.67 9.33	PODIFIE	618 79. LEQ 82.	0.00	HODIETEN	678 79. LEQ 82.	11.11	HODIFIC	618 79. LEQ 82.	35.29
ON INCEX	67F 76.	2.67	ON INCEX	67. 76. 160	30.0	ON INCEX	571 76. LEO 79.	000	ON INCEX	576 76. 120 79.	17.65 35.29
WATER SEPARATION	678 73. LEQ 76.	1.33	SEPARATION	678 73. LEG 76.	0.00	SEPARTION	6: P 73.	00.00	SLFAFATION	67 K 73.	2 11.76 17.65
	67 k 70. 160	00.00	WATER	61.R 73. 160	0.00	MILE	618 70. 73.			70. LE0	5.86 5.88
DISTRICT 5	LE0 70.	0000	DISTRICT 6	LEG 70.	000	DISTRICT 7	70.	0.00	UISTRACT P	160	0000
016		FRED FCNT ACUM	0.0		FP EQ PC NT	310		FF ED FCNT ACUM	0.13		FE ED FC UT

MISSING VALUES

SAMPLES 235

SAMPLES 66

99

.26 FEFORT

.40 SICHA

1EAN

PARTICULATE CONTAMINATE, "GALITER

DISTRICT 1

LEG.0

0.00

FOED

SAMPLES

Particulate Contaminate Table XX.

3.33 OF REPORTS

SAMPLES

3.63

FE NT

0.00

00.00

1.72

PC UT

0.00

FOR PORT

010	DISTRICT 5	S PAPTICULATE		CONTAMINATE,	E, 16/LITE		#	4E AN	.37 51	SIGHA	.23 RE	REPORT	77. SAMPLES 76
	00.00	61.00 1.00 1.00	61. 1.00 1.20	61r - 20 LEQ	8.057.		618 1.56 1.69	61.F	618 LE0 .89	618 . 80 LEJ . 90	618 .90 LEQ 1.00	1.00	MISSING
FP ED FP NT ACUM	0.00	15.79 15.79	15.79	23.6c 55.26	15.79 71.05	10.53 01.58	2.63	5.26	5.26	2.63	2.63	100.00	1.30 PRCMT OF REPORTS
13	CISTAICT 6	S FARTICULATE		COM ANTHAT	E, "GALITER	5 E	Ť	Z P P P	.80 81	SIGHA	0.0 K	RE PORT	2. SAMPLES 2
	0.00	979	7	32.32.	£.53.	64. 04. 08.	012 LE0 1.60	6TH - 60 LEG	67 R 1. 7. 1. 80	67.8 . 8 LEO	678 .90 LEO	1.06 1.06	MISSING
Press Press	0.000	.00.0	0.00	333	0.00	0.00	0000	000	100.00	100.00	160.00	100.00	0.00 PRCNT OF REPORTS
10	DISTRICT	7 FAFTICULATE		CONTABILATE,	16, 56/L176º	4 60	Ť	AEAN	52.	SIGHA	• 26 RF	RFFORT	S SAMPLES 8
	9.00	6.00 LF0	670 1.10 1.20	175 2.2 1.5 2.3 3.5	678 1.60 1.60	6 4 6 7 1	67.	67 t 60 0 57 t	8	C13 LE0	67R . 90 LEQ 1.00	1.00 1.00	MISSING
FFED PCNT ACUM	00.00	37.50	37.50	25.02	0.00	12.50	0.00	25.30	100.00	100.00	100.00	100.00	11.11 PHUNT OF REPORTS
10	DISTRICT	8 PARIIC	PARITCULATE CO	CON. AMIPATE,	TE, MG/LIT	17.51	Ī	HEAN	\$ 54.	SIGHA	.25	REPORT	17. SAMPLES 17
	00.00	9.00 0.00 0.00 0.00	676 110 120	67F .20 LEC	8 6	94.0	618 150 150	STR LEG LEG	67R . 70 Leg	CE. 20	6TR •90 LEG	1.00	MISSING
FRED	0.00	9.00	23.53	5.88	17.65	5.68 52.94	29.41	5.83	0.00	5.86	5.88	100.00	PECNT OF REPORTS

SAMPLES 61	MISSING	7.58 PRCNT OF REPORTS	SAMPLES 162	MISSING	T 4.14 PALNT OF REPORTS	SAMPLES 227	MISSING	24 9.56 PRONT OF REPORTS	SAMPLES 60	MISSING	0.00 PACINT OF REPORTS
.90			169.			251.			60.		
KEFORT	61K .020	100.00	FPORT	6TK .020	3.30	PEPORT	6TR . 620	100.00	EFORT	61R .020	100.00
. 0028 K	618 .018 LEQ .020	100.00	. 0028 F.	61R .018 LEO	0.00	. 0026	6TR • 618 LEO	0.00	, 0028 F	6TR • 018 LEQ • 020	100.001
SIGMA	618 .016 .EG	100.00	SIGMA	678 • 016 • 016	100.00	SIGHA	618 • 016 • 018	100.00	SIGMA	618 .616 LEG	100.00
JS +00.	.014 LEG	100.00	.006 SI	6TR • 014 LE0 • 016	0.00	.006 SI	678 . 314 . 60	100.00	.006 SI	618 .014 LEQ	1.67
MEAN	61R .012 LEO.	1.64	HEAN	6TR .012 LEG	2.47	HEAN	618 . 412 LED	99.50	JEAN	618 • 012 LED • 014	0.00
¥.	67k .016 LEG .012	3.28	¥	618 .010 LEQ .012	3.09	ř	67k .010 LEQ .012	28.66 48.56	Ŧ	618 .010 LEQ	1.67
	618 150 150	4.02		618 .908 150	14.20		61.F 1.00 1.010	8.61 96.04		678 .006 LF0	18.33
4.4	900.	00.16	¥.	618 600.	39 24.07 89.25	3	67° .106 LEO	20.70	2 4	618 160 160	16.67
1.5 KOH/5: 4	.074 LED .016	14.75	AG KON/SPA	616 .004 LEO	37 22.84 56.17	6 KOF/6PAV		34.80	PL KOHZGE	676 . 304 LF0 . 306	23.33
(4	1002	18.03		610 Le 0	33.33	U. 37K, Y	61P -032 LL0	13.82	NUI BER,	. 902 LEO	11 18.33 29.33
ACIO NUPE	619 6.960 150	32 52.46 52.46	ACID NUMBER	6.50 LEQ	400	/CI0 HU.3	61F 0.00. LEO	11.01	ACIO	618 0.009 1.50	10.00
DISTRICT 1	0.000		STRICT 2	000000	0.00	DISTRICT 3	0.000	0 00 °	DISTRICT 4	9.880	0.00
0.1		PCNT PCNT	013		FE FO FC NT ACUM	010		FPEQ FCNT ACUM	10		FRED PCNT ALUM

SAMPLES 62	MISSING	15 19.46 PHONT OF REPORTS	SAMPLES 2	MISSING	0.00 PRCNT OF NEPORTS	SAMFLES 9	MISSING	PHCNT OF KEPURTS	SAMPLES 16	MISSING	5.88 PHCNT OF REPORTS
::		С.	2.		•	•			17.		
F EPORT	61k	100.00	FPORT	.020	100.00	REFORT	618 0.50	100.00	EPORT	6TK .02u	100.00
.0030 F	618 618 619 020	100.001	3000 FF	678 • 018 • 020	100.001	. 6611 #	618 - 018 - 620	100.001	. 0024 PE	67K • 018 LEO • 620	100.00
SI6nh.	678 • 616 • 616	30.001	STEMA	678 • 016 • 016	0.00	SIGNA	678 • 916 • 616 • 916	10.00	SIGHA	618 • 016 • 016	103.00
307 SI	678 .314 LL0	00.00	1S 800	678 • 314 Leg • 016	100.00	25 200	618 .014 .116	0.00	. 800°	618 .014 .50	100.00
JEAN.	618 .012 LEO	3.23	A	613 .012 .50	0.00	1E AN	67 A .012 LEO .014	100.00	JEAN N	678 • 012 (50	100.00
4	618 .016 .012	6.45	ţ	678 - 010 - 010	100.001	=	618 .610 .120	1,00.001	T	67P 10 	000
		16.13			150.00		90.10	100.00		7.00 7.00 7.00 7.00 7.00	5.25
	67.0 0.096 0.096	19.35	) d	67.K .03.6 .03.0	100.00	N.	600. 600.	0.00 100.00 100.00	7 4	614 6106 6106	25.06
S KOHZG	.00.	32.26	POHOX SE	.356 1.50 1.50 1.50	10.00	F5 K0H/6r	470. 470.	11.11	457H0X 54	.01 200. 200.	25.00 08.75
,	796.			. 302	53.00	:	3.02		NUP 95 P.	67R • 002 LEU • 094	12.53
ACIO NURS	0.00 0.00 0.00	* 05 * 05	ALID NU437	67 K	56.03	FUID NURSE	6.000 4.000 4.000	77.77	ACIO	0.000	31.25
DISTRICT 5	000.00	00.00	01576107 6	LEO	0.00	DISTRICT 7	0.000	0.00	DISTRICT 8	000.0	0.00
270		FC FO	010		FF FO FC NT	01.0		FF ED PC UM	10		F F F F F F F F F F F F F F F F F F F

SAMPLES 65	HISSING	1.52 PPCNT OF REPORTS	SAMPLES 161	MISSING	PKCN1 OF REPURTS	SAMPLES 248	MISSING	1.20 PRCNT OF REPORTS	SAMPLES 57	MISSING	5.00 PRONT OF REPORTS
PEFORT 66.	67.k 12.6	3.08	PEPURT 169.	6TR 12.0	3.73	REFORT 251.	6TR 12.0	. 81 160.10	PEFORT 60.	6Th 12.0	106.00
2.2 PE	618 11.0 LEQ 12.0	26.96	2.5 PE	6TR 11.0 LEQ 12.0	.62	2.0 RE	678 11.0 LEG 12.0	2.02 99.19	1.5	67R 11.0 LEO 12.0	1.75
SIGHA	61K 10.0 LE0 11.0	3.06	SIGHA	6TR 10.0 LEG 11.0	1.86 95.65	SIGNA	101 100 111 11 100 11 1	97.10	SIGMA	618 10.0 11.0	98.25
5.7 SI	678 9.0 10.0	4.62 93.85	5.3 SI	678 9.0 LEQ 16.0	2.43	5.0 SI	61K 9.0	0.00	5.4 SI	67R 9.0 10.0	0.00
MEAN	619 0.0 1EG	0.00	HEAN	67.8 8.0 1.60 9.0	. 62 91.30	FAN	61P 8.0 LEQ 9.0	1.61 96.37	A P A N	67.R 8.0 LE0 9.0	98.25
46	678 6.0 8.0	1.54	H.	678 7.3 1.60	3.73	=	678 7.0 LEQ	2.82	Ť	618 7.0 LEQ	8.77
z	616 6.0 7.0	6.15 87.69	z	67 B 6 0 1 C C C C C C C C C C C C C C C C C C	9.00 4.00 4.00 4.00 4.00 4.00 4.00 4.00	Z I T	6. F. C.	7.26	Z H	67 F 1 F O 7 • 0	10.53
GALLON, MIN	678 5.0 6.0	16.92 £1.54	CALLON, MI	678 5.0 1.60 6.0	10.56	GALLON, 47	618 5.0 6.0	10.89	CALLON, "	618 6.0 6.0	14.04
1 1	616 LEG 5.0	46.15 64.62		9.5 9.0 9.0 9.0	22.96	-	67 F 1 6 C C C C C C C C C C C C C C C C C C	25.40	TIPE, 1 CAL	1.30	42.11.
TION TIN	673 1.50 1.50	13.85 18.45	-I: 60I.	£ 5 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	27.33 43.48	34I1 MOT 1	9.7.	88. 8. 9. 4. 9. 4.	IT NOIT	a	19.30
FILTRATIO	67.8 2.9 LEO 3.6	 	FILTRATION	22.0031	26 16.15 16.15	FILIPATION	67.R 2.0 1.5.0 3.0	14.11	. FILTRATION	3.00.2	3.51
DISTRICT 1	LE0 2.0	0.00	UISTRICT 2	LEG 2.6	00000	DISTRICT	2.0	500	DISTRICT 4	2.0	0000
018		Fr 50 FC NT	018		FFED	\$10		FRED FONT	07.5		PP FO

SAMPLES 72	MISSING	5 6.49 PRENT OF REPORTS	SAMPLES 2	MISSING	D. D. PRCNT OF REPORTS	SAMPLES 6	MISSING	33.33 PKCNT OF KEPOKIS	SAMPLES 16	MISSING	5.48 PECNT OF REPORTS
.11.		ā	<b>?</b>		ī	5		ā	17.		ā
REFORT	67K 12.0	1.39	KEPORT	61k 12.0	100.00	REPORT	67K 12.0	100.00	REPORT	61h 12.0	160.00
1.6 R	67R 111.0 LEQ 12.0	0.00		67R 11.0 LEQ 12.0	100.00	2.9	6TR 11.0 LE0 12.0	100.00	8.1	678 11.6 LEQ 12.0	10000
SIGMA	67R 10.0 LEO 11.0	0.00	SIGHA	61R 10.C 11.0	100.00	SIGMA	11.0 11.0	16.67	SIGHA	61.8 16.1 11.0	100.001
4.3 SI	6TR 9.0 LEQ 10.0	98.61		9.0 LEO 10.0	100.00	5.2 51	67R 9.0 10.0	8 3.33	5.8 51	9. 10. 10. 10.	100.00
4E AN	618 8.0 LEO 9.0	20.00 20.00 20.00	JE AN	678 1.60 9.0	100.00	4E AN	65.0 9.0	0.30	Z Z	9.05 9.05 9.05	100000
35	61K 7.0 LF0 6.0	000000000000000000000000000000000000000		678 1.00 8.0	1,0.00	¥	618 670 6.0	0.00	34	51P 7.0 LEO	31.25
z	678	2.76	Z	67. 1.0 7.7	100.00		6.8 6.0 1.50 7.0	0.00	N.T.	1.6	0.00
GALLON, MIN	618 5.0 6.0	55.95 55.05 55.05 55.05	GALLON, 11	5.8 1.60 6.0	0.00	LON, MI	518 5.3 1.50 0.0	0.00 63.33	CALLON, WI	618 5.0 LF 0	25.00
ME, 1 GAL	618 4.0 LEC 5.0	33, 33	•	615 LEO 5.5	36.3	JE, 1 CALLON,	67F 4.3 LEO 5.0	3.000			12.56
	150°°	25.03 55.56	NOI.	6.5 6.5 6.1	0.00	7	678 3.0 150 4.0	63.33 63.33	A: IO* 719	5.03	31.25
FILTER, TON	67 8 2 6 1 5 0 3 • 0	27.78		67.8 2.0 3.0	000	FILTEATION	67.8 1.50 3.0	0.00	FILTEA	67.6 2.0 1.60 3.0	12.50
OTSTRICT 5	2.0	2.7.2	STRICT 6	2.0	0000	DISTRICT 7	LE0 2.6	0000	STRICT S	2.0	000.0
OTS		PC NT	07.8		FF ED FC AT	013		A CENT	013		PPEO PCNT ACUM

66. SAMPLES 51	MISSING	22.73 PRCNT OF KEPORTS	169. SAMPLES 135	HISSING VALUES	20.12 PHENT OF REFORTS	251. SAMPLES 213	MISSING	38 15.14 PRLNT OF REPORTS	60. SAMPLES 58	HISSING	3.33 PKCN F OF REPURTS
RFFORT	10.0 10.0	1.0.00	FEFORT 1	67R 10.0	100.00	KFFORT 2	67K 10.0	1.00.00	REPORT	10.0	100.00
.86 R	6TR 9.0 10.0	100.00	1.20 F	678 9.0 LEG	100.001	141	676 9.0 10.0	100.00	8 29.	678 9.0 LEO	100.00
SIGMA	618 6.6 1.60 9.0	100.00	SIGHA	GTR CEO LEO	0.00	SIGHA	GTR LEO 9.0	100.00	SIGHA	9.6	100.00
s	67R 7.0 LEG 8.0	100.00	3.	GTR 7.U LEG 8.0	.74 59.26	.2 5	618 7.0 6.0	100.00	.2	67. 6.60 8.5	100.00
HEAN	GTR 6.0 LEG	100.00	HEAN	6.0 LEO 7.0	0.00	HEAN	678 6.6 7.0	100.00	1E AN	678 6.0 7.0	100.00
•	67R 5.0 LEG	100.00	•	678 5.0 LEG	0.000	•	618 5.0 Lt.0 6.0	170.00		61k 5.0 LEG 6.6	103.00
	6TP 4.0 1.80 5.0	1.96		0.4. 0.5. 0.5.	. 74. 90.52		8.4.1 9.0.1 9.0.2	100.001		5.05	100.00
	3.0 LEQ 4.0	0.00		678 3.5 LEQ	.74		3.5 6.1	100.00		3.6 LEQ 4.0	1.72
0F HG	67.6 2.0 1.50	1.96 98.64	OF HG	22.6 LEO 3.6	0.0 0.0 0.7.79	OF 46	67.6 2.0 1.50 3.0	100.001	OF HG	67.5 2.1 LEG	90.58
77 0	67R 1.0 LEO 2.0	3.92	A A	678 1.0 1.0 2.0	3.70	2 11	678 1.0 1.0 2.0	3.29	a II	1.0 LFQ 2.0	5.17
1 DELTA	67 R 00.0 1.0	5.66	2 CELTA	678 00.0 1.0	14.07 93.33	3 0ELTA	67R 0.0 1.50	22.07	4 FELTA	67K 0.0 LT0 1.0	6.90 93.10
DISTRICT	e.e	44 86.27 86.27	STRICT	LEG	107 79.26 79.26	DISTRICT	LEC	74.65	DISTRICT	0.9	96.21 86.21
10		PC UH	10		FRED ACUM	10		FRED FCNT	10		PCNT ACUM

SAMPLES 60	MISSING	22.08 PHCNT OF REPORTS	SAMPLES	MISSING	44.44 PACNT OF REPORTS	SAMPLES 13	MISSING	23.53 PACNT OF REPORTS
.77		ď	;		4	17.		4
EPORT	10.0	100.00	EPORT	10.0	190.00		10.0	0.00
.67 REPORT	6TP 9.0 LEO 16.0	100.00	1.33 REPORT	67F 9.0 LE0 10.0	100.001	.04 REFORT	678 9.0 LEO 10.0	0.001
SIGMA	GTR CEG.	100.001	SIGHA	618 8.0 14.0	0.00 100.00	IGHA	618 9.0	0.00 0.00
.2 5	618 7.0 6.0	100.00	9.	67.8 0.6 0.6	100.00	.1 SIGHA	67R 7.0 1.0 0.0	0.00
NEAN	6.0 LEG 7.9	100.00	4E AN	6.0 6.0 7.0	100.00	T P P	618 65. 1.00	100.00
1	61.P	10.00	Ť	6.50 6.60	000000000000000000000000000000000000000	ř	678 5.0 LF0 6.0	0.000
	7 t t 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	160.00		119 119 119 119 119	103.00		6.00 m	100.001
	3.5 1.6 4.6	100.00		3.0 1.6 1.0 1.0	10.00		3.0 3.0 4.0	0.00
9H 40	2.6 2.6 3.0	90.00	9H ₹0	2.6 1.56 3.0	20.00	3F HC	2.0 3.0	100.00
an I d	2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	6.67	SCELLE C IN MM OF	677 1.0 1.0 2.0	80.00	PELTA P IN MM OF	677 1.0 1.0 2.0	0.00
DELTA P	6.0 1.0 1.0	5.33.25		0.00 T	20.00 80.00		67.6 1.0	60.23
OTSTRICT 5	P. 5.	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	DISTRICT 7	0.0	60.00	DISTRICT 8	0.0	30.77
01		PC SO	018		PER PONT	01.9		FPETO

Table XXIV. Thermal Stability Tube Color Code

52

SAMPLES 60	MISSING	22.08 PHUNT OF REPORTS	SAMPLES	MISSING	44.44 PRENT OF REPORTS	SAMPLES 13	MISSING VALUES	23.53 PRONT OF REPORTS
.77		<b>a</b> .	,			17.		4
EPORT	61R 5.0	100.00	KEPORT	5.0 5.0	100.00	KEPORT	5.0 5.0	0.30
.45 REPORT	6TR 4.5 LEO 5.0	100.00	0.03	67k 4.5 LE0 5.0	1.6.00	. 3E	67R 4.5 LEO 5.0	100.00
SIGMA	61R 4.0 1.5	100.001	SIGHA	618 LE0 4.5	100.00	SIGHA	64 P	0.00
.7 SI	FE 0 5	100.00	1.0 53	618 3.5 4.0	100.00	8. SI	61R 3.5 LEG 4.0	0.00
HEAN	6TR 3.0 LE3 3.5	100.00	1E AN	61 k 3.0 3.5	100.00	HEAN	61 P 3 • 0 1 • 5	100.00
¥.	618 2.5 LE0 3.0	100.00	7	61K 2.5 LEQ 3.0	100.00	¥	618 2.5 LFQ 3.6	100.00
	67.8 18.0 2.5	100.00		2.5	100.00		61F 2.0 2.5	100.001
	67.6 1.5 LEQ 2.8	3.06 100.00		619 1.5 LEG	100.00		67R 11.5 LEQ 2.0	100.00
	67. LEG	1.67		1.5 1.5	100.001		61F 1.0 LF0 1.5	100.00
VISUAL PATING	1.05	68.33 58.33	VISUAL FATING	6.8 LE0 1.6	100.00	VISUAL KATING	6TR LEQ 1.0	84.62
	6TR 0.0 160	3.33		6TP 0.0 LEO	000		61R 0.0 LE0	0.00 15.38
DISTRICT 5	0.0	16 26.67 26.67	DISTRICT 7	LE0	0.00	DISTRICT 8	6.0	15.38
OIS		PCNT ACUT	270		PC UM	015		PC NT

					Table XXV.	. 1978 Totals		(All Properties)	s)				
TOTALS	01571	DISTILLATE IN	:	SCILING OF.			FAN	138. \$	SIGHA	13.1	PLF 041 65	651. SA	SAMPLES 610
	115.	127.	15.5.	130.	135. 135.	140.	67.8 145.	678 159	678 155.	156.	61.		PLSSING VALUES
•	120.	125.	130.	135.	1.0.	145.	150.	155.	160.	165.			
4.26	6.05	4.75	16.67	15.25	16.07 61.15	12.79	8.03 61.97	7.05	5.38 94.10	4.10 98.20	11 1-80	PRONT	41 6.30 OF REPORTS
TOTALS	DISTILL	147.4.172	PECCUTE	.F., Dr.6	u	=	E An	201. SI	SIGHA	16.9	REPORT 651		SAMPLES 645
	165. 190.	1100	610 195. LEG 200.	200.	285. 210.	219. 219. 215.	612 215. LEG 220.	618 226. 225.	612 225. LEG 230.	618 230. 150 235.	6Th 235.		MISSING
111 17.21 17.21	11.63	27.5	13.77	10.54 57.63	71.63	7.13	86.38	3.72	3.72	1.55	26 4.03 130.00	PKCNT	.92 OF RLPORTS
TOTALS	CISTIL	ISTILLATM 20%	2 SECOVE	. EU, Or G	u.	ī	HE AN	228. SI	SIGNA	9 6.02	KFFURI 65	651. 541	SAMPLES 638
LEG 175.	675 175. 150 185.	185. LEO 195.	67. 195. 180 205.	618 285. 160	6.16 215. 15.0 235.	61x 225. LEO 235.	673 235. LEO 245.	61R 245. LEO 2555.	618 255. LEG 265.	618 265. LEG 275.	61k 275.		FISSING
	116	31 4.86 5.02	7.59	15.35	19.26	20 130 58 03	3.46 81.50	7.93 39.50	4.23	3.92	2.35	PACAT	2.00 OF REPORTS
1978 TOTALS	CISTILLA	LLATH 5°2	Z PECCVEFFU.	FFU, DeG	u		4E AN	295.	SIGHA	27.4 8	REFORT 65	651. SA	SAMPLES 633
LEG 220.	675 220. 150 235.	67.P 235. LEO 250.	676 250. LEG 265.	67.8 265. 160	6.8 280. 150 295.	61R 295. LF0 310.	678 310. 325.	618 325. 160 340.	677 340 LEG 355	618 355. LEO 370.	370.		MISSING
0.00	96.	3.49	10.94	119 18.86 33.23	111 17.59 50.87	126 19.97 70.84	10. 15.85 66.69	94.93 94.93	3.49	1.58	100.00	PECNT	3.07 0F REPORTS

DISTILLAT
355. 353. L-0 LF0 350. 265.
6.84 5.63 11.25 16.8c
ISTILLATH END POINT, D
67.3 678 395. 410. LEO LEO 410. 425.
41 35 6.34 6.03 13.66 16.6° 2
REDUVENTO AT 400
618 611 618 64.0 42.0 84.0 1.0 1.0 1.0 32.0 84.6 66.0
7.74 6.06 9.50 17.52 23.7c 52.90
GPAVITY, DEG ATL
6716 6719 443.0 443.0 45.0 150
.60 .96 3.50 1.75 2.71 5.21

SAMPLES 609	MISSING	6.42 6.45 KE PORTS	ES 597	MISSING	8 - 29 RE PORTS	LES 287	MISSING	364 55.91 REPORTS	ES 629	HISSING	3.38 REPORTS
651. SAN		PRONT OF	I. SAMPLES		PKCNT OF	I. SAMPLES		PRCNT OF	I. SAMPLES		PRCNT OF
Kt. POFT 6	61R 5.0	160.00	KEFORT 651.	. 500	100.00	REFORT 651	.0010	1 30.00	KEFORT 651	3. E	1,00.00
.64	6:1K	100.00	. 042 KE	6TR • 450 LE0 • 500	0.00	U 6029 RE	.0009 LEQ .0010	33 11.50 100.00	.24 1.6	67k 2.9 LEG 3.0	4.29
SIGHA	61R LE0 4.5	100.00	SICHA	678 • 400   LEO   450	100.00	SIGHA .	. 0000c LEG	2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 ×	SIGNA	61R 2.0 2.9	65 10.33 95.71
	8	00.00	.042 S	678 . 35u Leo	100.00	9000	. 3303 LEQ	13 4.53 85.71	2.5	678 2.7 1.60 2.8	11.75
HEAN	61 R 3.0 LEG 3.5	39.86 99.86	AP	6Th • 300 LEG • 350	100.00	1F AN	. 0000 . 0007 . 0007	4.13 81.10	4+ AN	6+8 2.6 LEG 2.7	17.17
	2.5 LEQ 3.0	100 00 00 00 00 00 00 00 00 00 00 00 00	Ŧ	67K . 250 LFQ	170.00		61K 6205 LEG	23 8.01 77.00		67K 2.5 LEQ 2.6	107
	67F 2.9 16G 2.5	1.64		2200	34.	• CrNT	4000. 0000.	31.031		2.2.7.	39. 43
7	678 1.5 1.0 2.0	1.81	FFF CENT	616 150 160	2.35 99.33	FIGHT PE		31.	· ·	618 15.0 2.4	11.45
, FG/103FL	1.50 1.50	6.24	HE16F.	67. 1100 1150	9 9 31		.0002 LEG	16.63	rasume, t	67. 2.2 1.5.6 2.3	7.007
EXISTENT GUM,	6.4	9 . 6 . 6 . 6 . 6 . 6 . 6 . 6 . 6 . 6 .	Streue,	673 .050 LEQ	36 14.41 91.73	REPCAFTAN SULF"	. 00391 1.00 1.00	13.94 31.36	VF CO. F.	6.8	32 6.20 10.49
	9.6 0.50 6.60	203 34.32	10741	613 0.303 1.50	461 77.22 77.39	A CO CA	0.3000 LEQ .0001	50 17.42 17.42	2133	676 2.0 LEO 2.1	3.60
1976 TOTALS	0.3	276	TOTALS	1.000	.17	TOTALS	Leo 9.0000	00.00	TOTALS	2 .	411
1976		FRED FONT ACUM	1978		FP FO A A C UM	1978		PONT PONT PONT	1978		FF ED FC UM

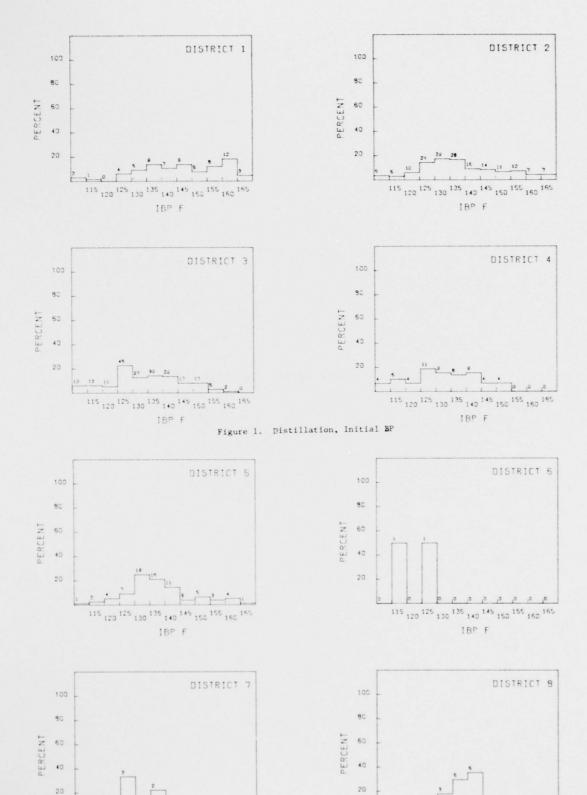
ES 597	MISSING VALUES	8.29 REPORTS	\$ 614	MISSING	37 5.68 REPORTS	7 99 0	MISSING VALUES	7.22 REPORTS	S 572	HISSING	79 12.14 REPORTS
SAMPLES	74	PRCNT OF R	SAMPLES	r. A	PRCNT OF R	SAMPLES	r ×	PRCNT OF A	SAMPLES	r 4	PRCNT OF R
651.			651.			651.			651.		
REPORT	61R 43.9	100.30	REPORT	61R 25.0	100.00	REPORT	61R 5. J	100.00	REPORT	6TK 15.10	0.00
7.	6TR 43.8 LEQ 43.9	.34 100.00	3.25 8	6TR 22.5 LFQ 25.0	100.00	.42	67R 4.5 LEQ 5.0	160.00	.22	GTR 14.95 LEQ 15.10	0.00
SIGHA	61R 43.7 LEG 43.6	31 5.19 99.66	SIGHA	6TR 20.0 LEG 22.5	100.00	SIGHA	67R 4.0 LEG	100.90	SIGMA	6TR 14.86 LEG 14.95	100.00
43.5	67R 43.6 LEQ 43.7	156 26.13 94.47	11.4 S	678 17.5 LEG 20.0	2.12 98.53		678 3.5 LEQ	100.00	14.36 S	GTR 14.65 LEQ 14.80	7.69
H P P	6TR 43.5 LE0 43.6	32.50 63.34	HEAN	GTR 15.0 LEO 17.5	10.42 96.42	HEAN	678 3.0 LEG 3.5	.33 100.00	HEAN 1	6TR 14.50 LEQ 14.65	24.30 92.31
	61R 43.4 LEQ 43.5	116 19.43 35.85	·	6TR 12.5 LEQ 15.0	117 19.06 35.99	•	61R 2.5 LEQ 3.0	.33	T	6TR 14.35 LEQ 14.50	146 25.52 68.01
MJ/KG	6. K 43.3 1.00 43.4	10.72 15.42	F N	67.K 19.0 15.0	173 25.16 65.94		67.8 L5.0 2.5	99.66		67 P 14.20 LF 0 14.35	19.76
(CALCE)	618 43.2 LEQ 43.3	4. 50 5.70	VOLUME FENGENT	6TR 7.5 LF0 10.0	189 30.78 36.76	PERCENT	61R 1.5 LEQ 2.0	3. 52 3. 64 98.34	(CALCO)	678 14.05 LE0 14.20	12.06 22.73
6	43.2	1.01 1.01		67.5 5.0 LEO 7.5	7.17	, VOLUME	67.6 1.0 1.5	11.09		67F 13.90 LE0 14.05	37 6.47 10.66
UF COMBUST	610 43.0 150 43.1	0.00	AROMATIC CONTENT	91R 150 5.0	. 61	CONTENT,	678 LE0 1.0	328 54.30 63.61	HYDROGEN	678 13.75 LE0 13.90	3.67
HEAT	4.2.9 4.3.0	0000	AROHAT	678 0.0 150 2.5		OLEFIN	678 9.0 1.0 5.	26.31 20.30	PERCNI	618 13.60 LEQ 13.75	. 52 3
TOTALS	42.9	0000	1978 TOTALS	6.9	000	1978 TOTALS	rea 	955	1978 TOTALS	LE0 13.60	0.00
1974		PO PE	1978		PCNT PCUM	1978		PONT FOUT	1978		PC UN TO

1978	TOTALS	SHOKE	FOINT					H P N	27.5 S	SIGHA	3.30 F	REFORT 65	651. S.	SAMPLES 569
	13.0	113.0 113.0 20.0 20.0	22.0 22.0 22.0	67r 22.6 1.70 24.0	67.R 24.0 LED 26.0	67.6 1.69 1.69 23.3	618 28.0 15.0 30.0	614 36.0 32.0	678 32.0 LEG 34.0	67 R 34.0 16.0	618 36.0 160 38.0	35.0		MISSING VALUES
FREG PCNT ACUM	0.00	33.2	4.224	13.16 17.75	124 21.79 39.54	124 21.75 61.34	15.82	93 16.34 93.50	3.34	2.46 99.30	100.001	130.00	PRCNI	82 12.60 OF REPORTS
1978	TOTALS	MATER	SEPARATION	XEDAL NOT	X 'ODLETE	0	Ť	4E AN	90° SI	SIGHA	7.2 RF	REFORT 651.		SAMPLES 642
	LFG 70.	67 R 70.	678 73. LF0 76.	676. 76. LFG	67k 79. LF0	677 32. 170	2.03.	67.8 80. 91.	67R 91.	618 94.	67P 97. LEO 100.	6TE 160.		MISSING
PCNT PCNT ACUM	0.00	1.00	4. 21 5. 61	5.62	8.41 19.94	7.17	12.46 39.56	31 12.46 52.02	113 17.60 09.03	16.67 86.29	13.71 100.00	100.00	PRCNT OF	1.36 OF REPORTS
1978	TOTALS	FAFTIC	PARTICULATE CONTAMIN	ONTAMINAT	TE, *6/LTT	9 L	Ŧ	4E AN	. 37 SI	SIGHA	.24 PE	REPORT 651		SAMPLES 625
	9.60	0.00	61. LEO LEO	6Th .20 LEG	51 K .3 U LEQ	1.50	6TP .50 LEG	618 60 LEG	678 . 70 LEO	618 .86 LE3	6TR .90 LEQ 1.00	1.00		HISSING
FRED FCNT ACUM	1.60	17.44	19.20 36.24	14.86 53.12	15.20	60 75.32	7.84 54.15	4.054 88.30	5.92	3.84 98.56	1.44	100.00	PKCNT	3.99 0F KEFORTS
1978	TOTALS	ACID N	403630N	FS KOHZER	ā		7	1 A A	.006 SI	SIGMA .	. 0028 KF	KEPCKT 651		SAMPLES 599
	0.000	67.8 1.900 1.90	67 R 1932 150	0.00 . 100 . 100 .	61R • 036 • 008	616 .968 LEO	61K • 910 LEG	67R • 012 LEO • 014	618 • 014 150 • 016	67R •016 LEO •018	616 • 318 • 120 • 020	.020		HISSING VALUES
FRED FCUM	0 m m	15.86	20.03	28.38 64.61	115 19.20 53.81	66 11.35 95.16	7.01 98.16	1.50	33	100.00	0.00	100.00	PRCNT	52 7.99 UF RE PORTS

1. SAMPLES 627	PISSING	24 3.69 PRUNT UF REPORTS	SAMPLES 115	HISSING	536 62.33 PECNT OF REPORTS	SAMPLES 394	HISSING VALUES	257 39.48 PRCNT OF REPORTS
REPORT 651.	67K 12.6	11 1.75 100.00	4E PORT 651.	10.0	0.00	KEPOPT 651.	614 5.0	100.00
2.1	6TR 11.0 LEO 12.0	1.12	1.5	67.8 9.0 LEO 10.0	100.80	m.	61R 4.5 LEO 5.0	100.00
SIGHA	678 10.0 1.0 11.0	1.28	SIGMA	618 8 • 6 9 • 6	0.00	SIGMA	LE 4 1 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0.001
5.1	61R 9.0 LEG 10.0	1.12	1.1 3]	67R 7.0 7.0 8.0	. 87	1.0 SJ	61R 3.5 LEO 4.0	100.00
HEAN	618 6.0 9.0	34.74	1EAN	61R 6.0 7.0	0.00	1E AN	3.0 1.E0 3.5	100.00
	61R 7.0 1.60 8.0	93.034	•	6.0 6.0	98.26	-	2.5 2.5 3.0	100.001
11.10	6.6.0	7.66		6. 5 5.00 5.00	1.74		15.5 1.50 2.50 2.50	.25
1 5444011, 1	65.5 6.05.	11.48		3.0 3.0 10.0 4.0	2.61 96.52		67.8 1.60 2.60 2.60	5.08
	5.69.8	28.71 70.97	0F HG	12.0 13.0 3.0	1.74		677 1.0 1.5 1.5	2.54
FILIDATION TIME,	2.5.3.	27.59 42.26	90 MM VI 3	11.0 1.0 2.0	21 15.25 92.17	VISUAL FATT'6	6. e	346 68.32 91.38
רזנו	2.3 3.0 3.0	14.04 14.04 14.67	DELTA	675 0.0 1.0 1.0	35 73.91 77.91	VISUAL	6.00	3.55
1978 TOTALS	2.0	333	1978 TCTALS	0.0	00.00	1978 TOTALS	6.0	0.00
1972		A UNI	1078		FE EQUATE OF CURT	1978		FOED FONT

Of the missing values reported here in Fuel Thermal Stability, (i.e., Delta P and Visual Rating), ll6 of those are really missing values. The balance was actually reported as 0.0NOTE:

APPENDIX B - Histograms for 1978 Data

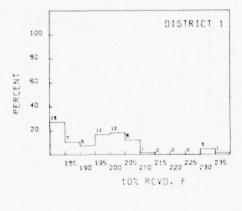


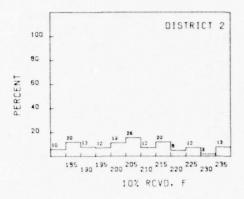
115 120 125 130 135 140 145 150 155 160 165

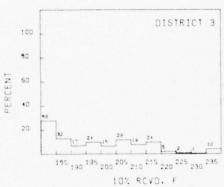
IBP F

115 120 125 130 135 140 145 150 155 160 165

IBP F







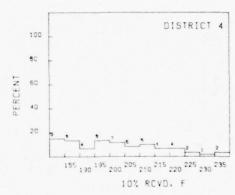
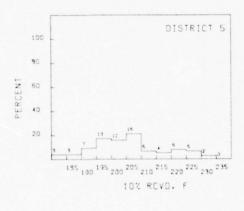
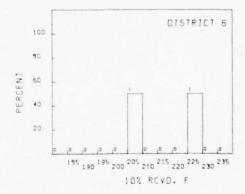
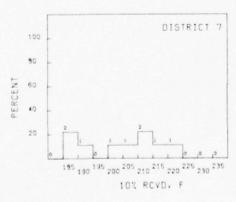
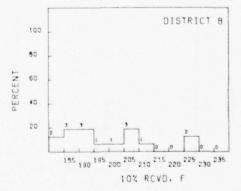


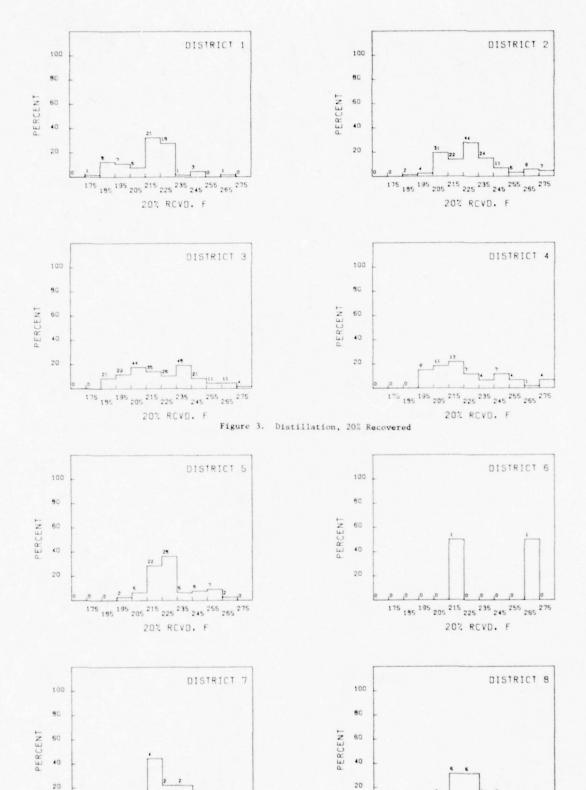
Figure 2. Distillation, 10% Recovered









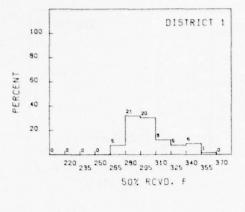


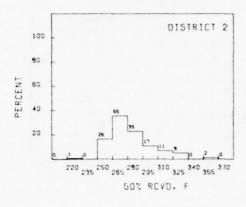
175 195 195 205 215 225 235 245 255 265 275

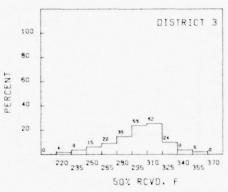
20% RCVD. F

175 185 195 205 215 225 235 245 255 265 275

20% RCVD. F







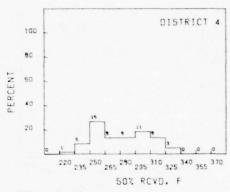
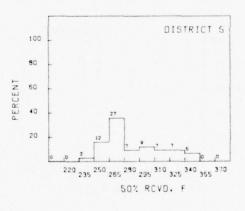
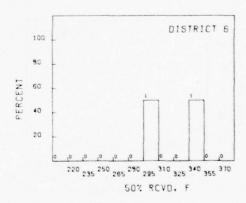
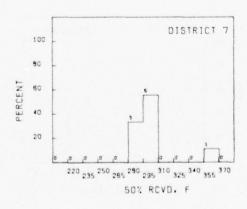
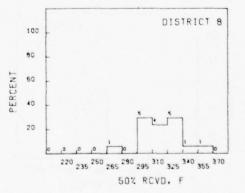


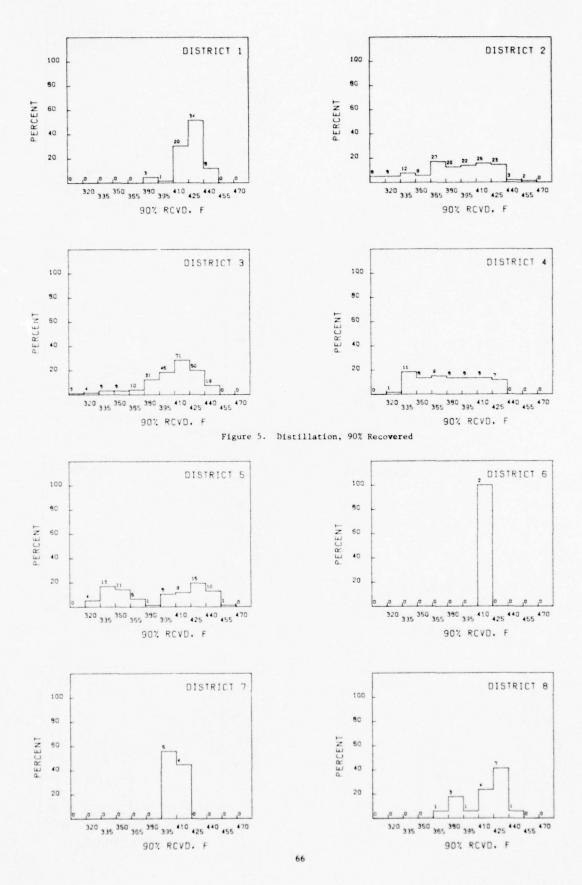
Figure 4. Distillation, 50% Recovered

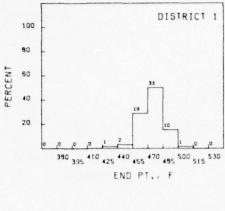


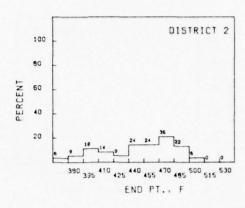


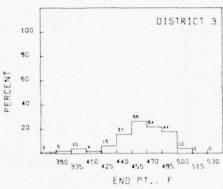












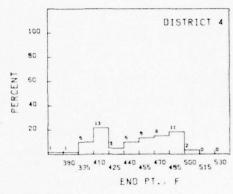
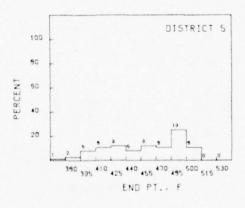
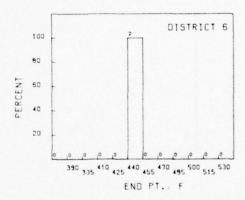
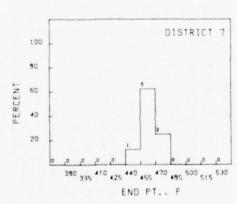
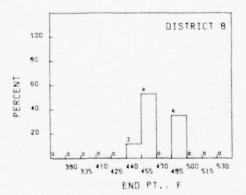


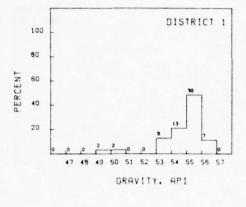
Figure 6. Distillation, End Point

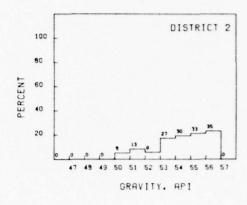


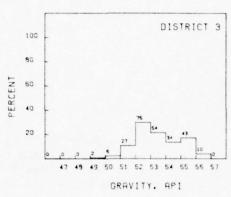












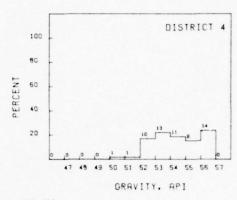
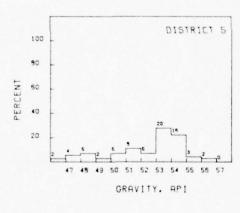
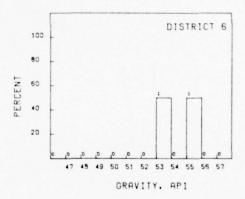
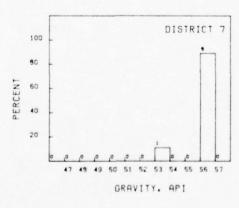
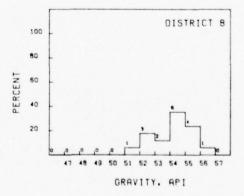


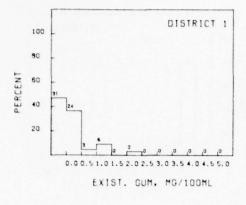
Figure 7. Gravity, DEG API

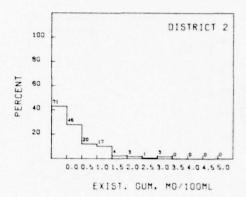


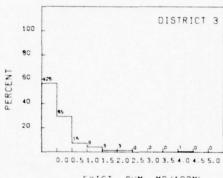


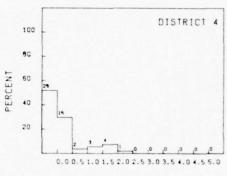


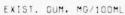




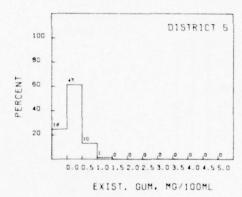


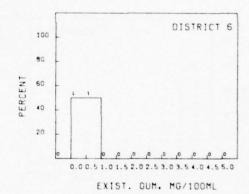


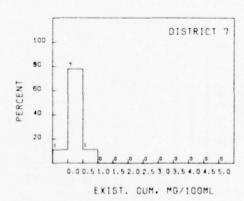




EXIST. GUM. MG/100ML







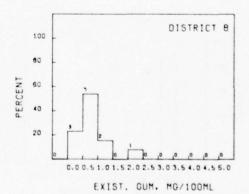
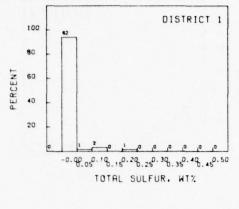
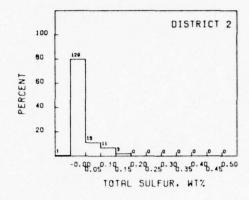
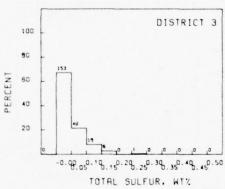


Figure 8. Existent Gum







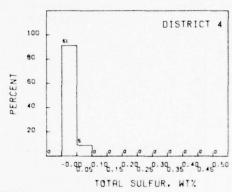
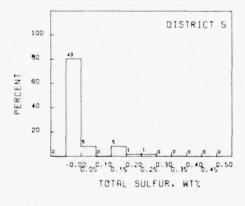
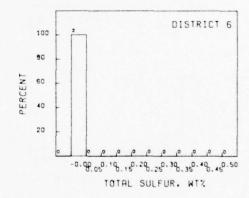
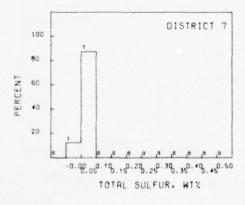
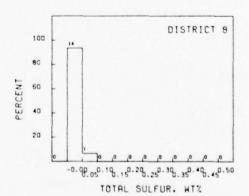


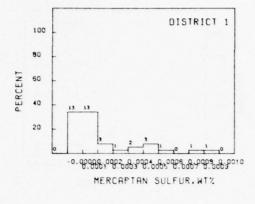
Figure 9. Total Sulfur

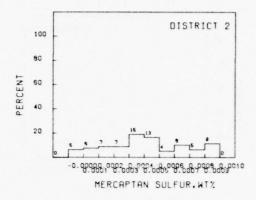


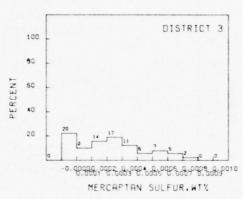












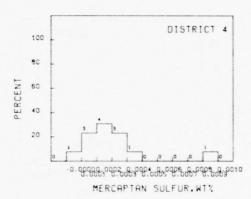
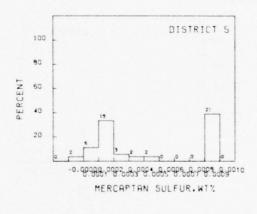
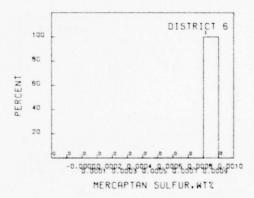
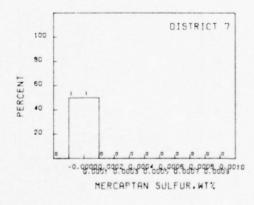
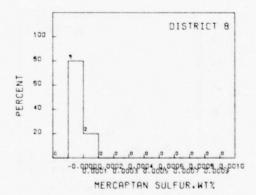


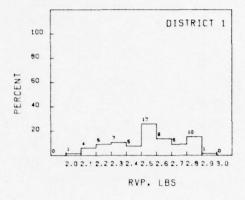
Figure 10. Mercaptan Sulfur

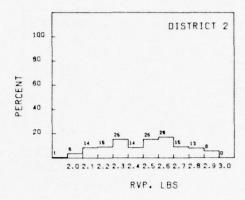


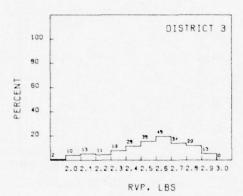












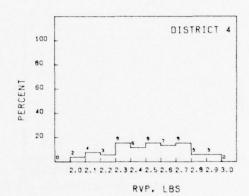
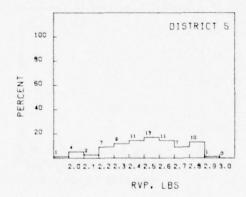
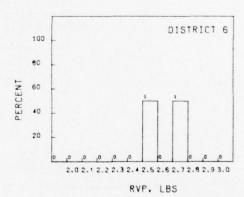
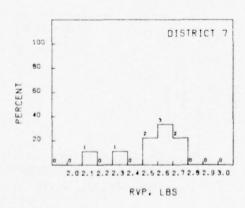
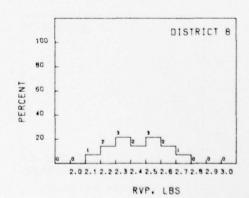


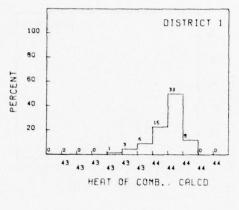
Figure 11. Reid Vapor Pressure

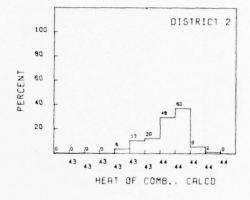


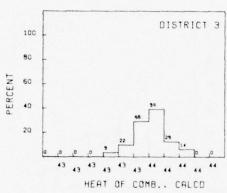












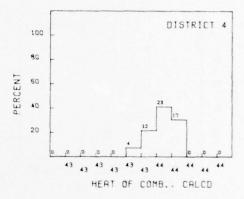
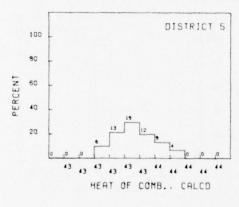
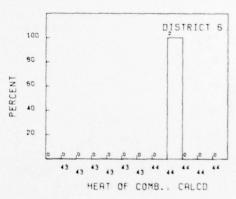
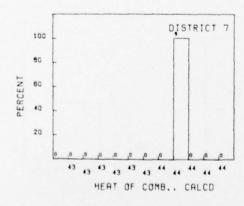
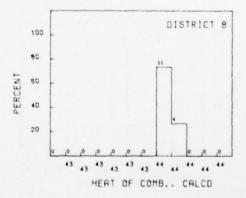


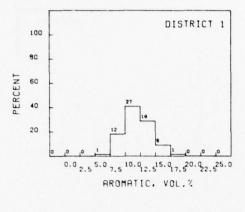
Figure 12. Heat of Combustion

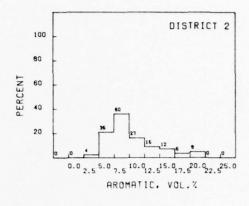


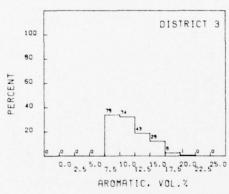












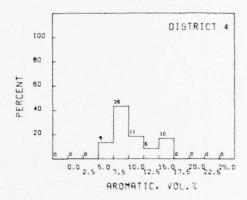
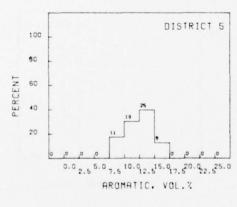
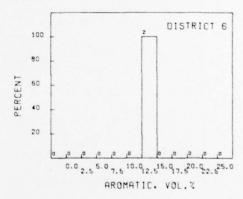
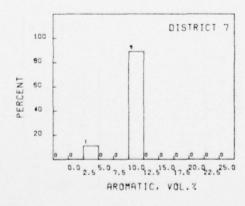
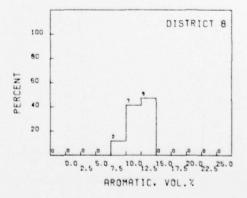


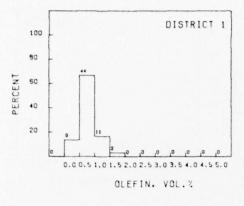
Figure 13. Aromatic Content

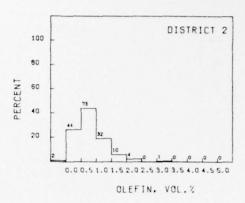


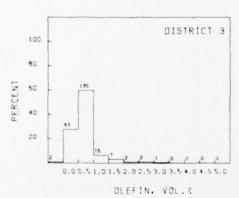


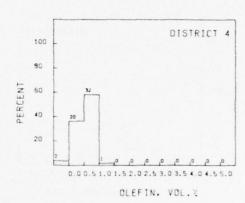


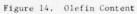


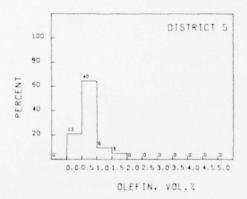


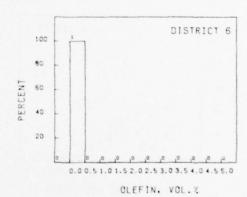


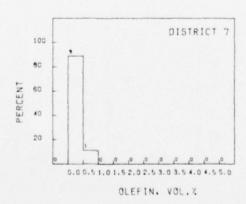


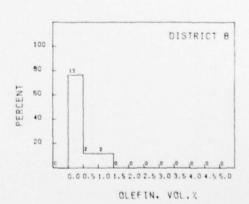


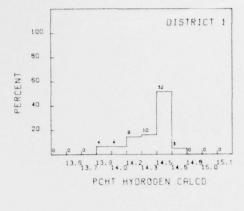


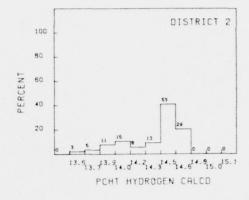


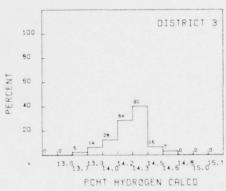












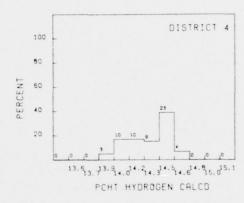
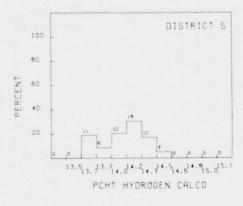
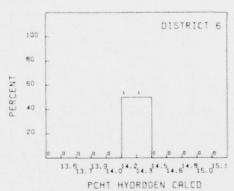
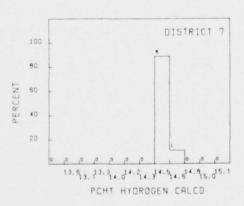
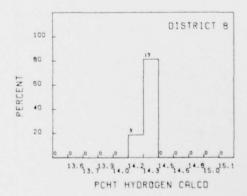


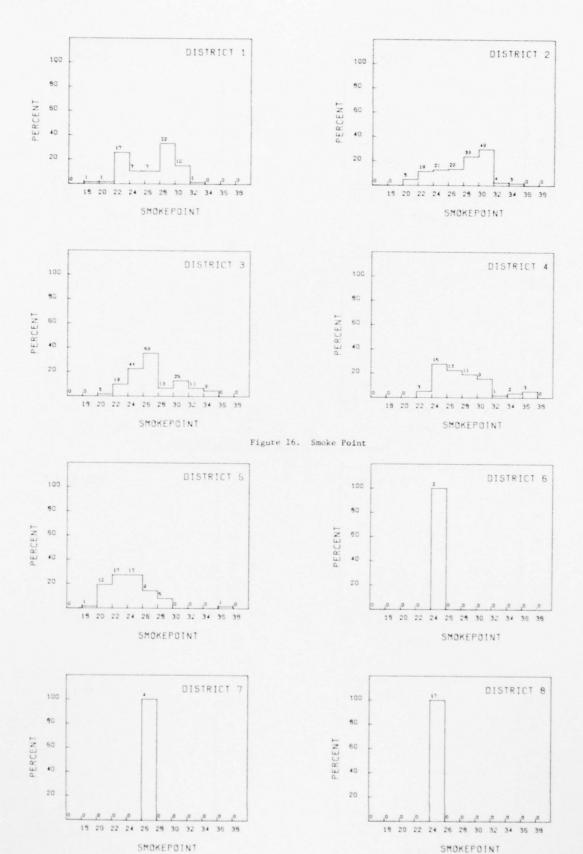
Figure 15. Percent Hydrogen

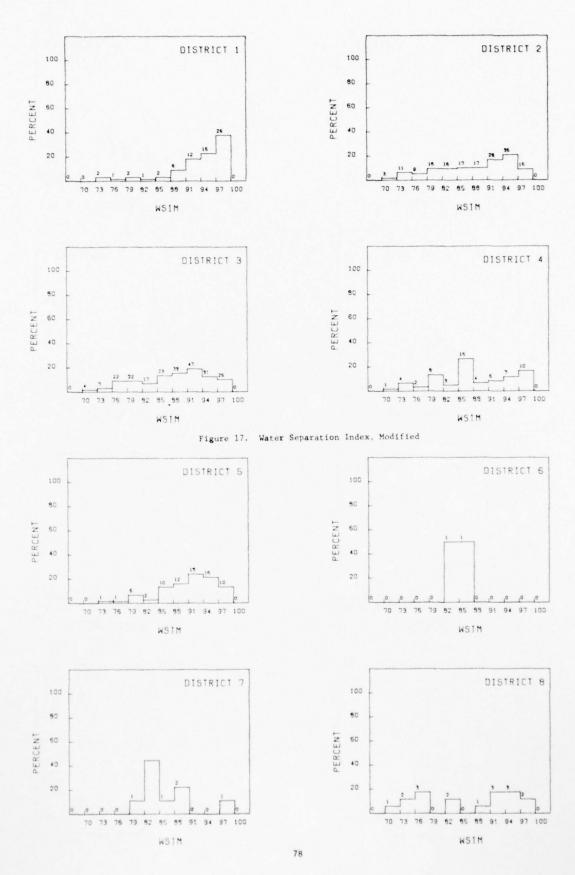


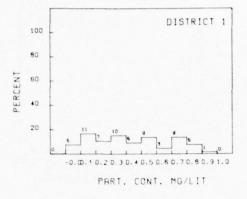


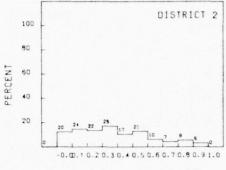




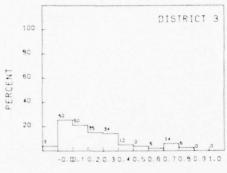


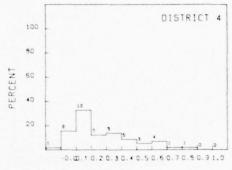








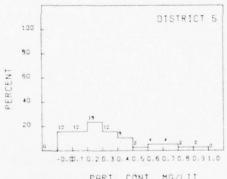


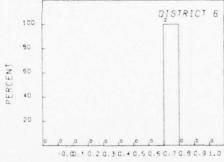


PART, CONT. MG/LIT

PART, CONT. MG/LIT

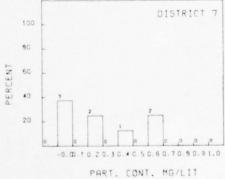
Figure 18. Particulate Contaminate

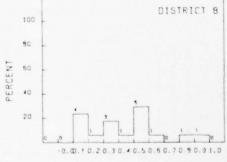




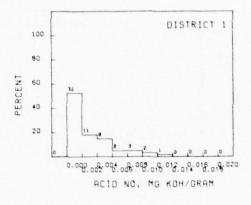


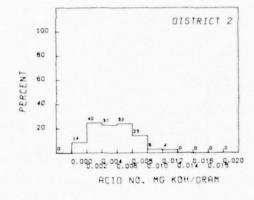
PART, CONT. MG/LIT

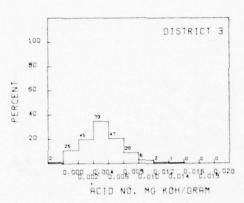




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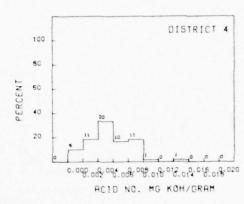
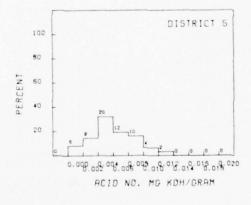
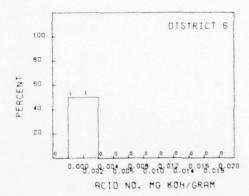
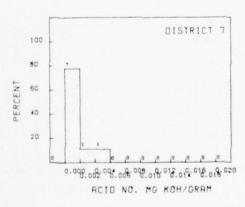
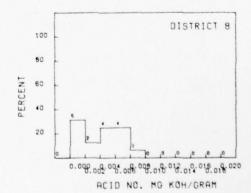


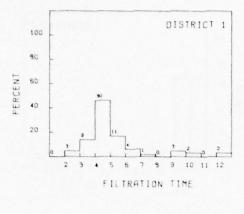
Figure 19. Acid Number

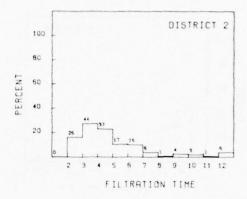


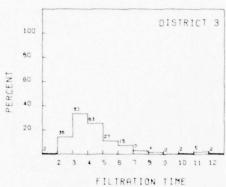












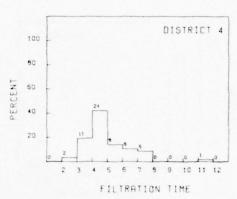
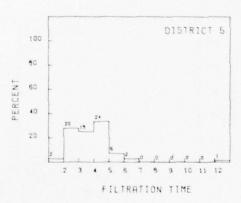
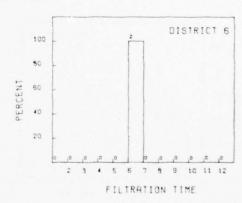
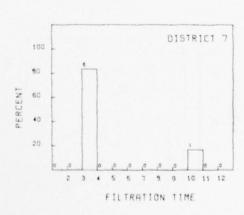
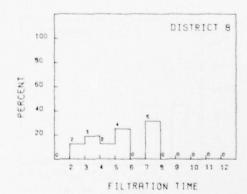


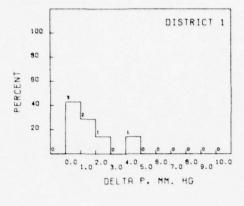
Figure 20. Filtration Time

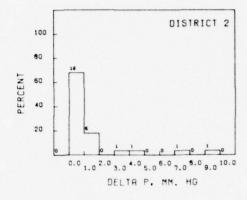


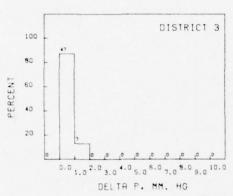












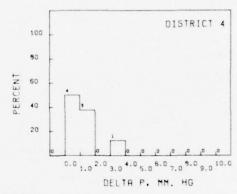


Figure 21. Thermal Stability, AP

